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FOREWORD

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this *Journal*

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Monthly Message

A few words about débridement of wounds. Guns and pellets of shot were mentioned by John of Arderne (1370) and Chaucer (1389). The latter was a friend of John of Gaunt and the former was a surgeon with a large practice among the nobility. In the *Canterbury Tales* John of Gadsden is presumably the doctor in the "Doctors Tale," but it could well have been John of Arderne, of fistula fame. The first surgeon to describe gunshot wounds, however, was Hieronymus Brunschwig, in 1497. Then and until the time of Paré, 30 years later, these wounds were considered to be poisonous. Brunschwig prescribed drainage as the initial treatment, much as at the beginning of World War I.

In 1586, however, Thomas Gale, an Elizabethan surgeon, wrote:

> Now seeing (as I suppose) I have sufficiently proved, neither the shot or powder to be venemous, it is convenient to show the methodicall cure of these kindes of wounds. And there are two intentions properly herto belonging. The one is to deliver the wound of all such things as are not agreeing to nature. The other is restoring of such things as are lost and perished. I call thinges not agreeing with nature not onely shot, yron, splintes or shivers of wood, cloth, dust, oyle or such lyke: but also the cloddes of bloud, mattier, brosed flesh and such lyke as have no societie with nature * * *. The restoring of that which is lost, is properly the office of nature, as to ingender flesh, blood, and such lyke partes as are to be engendred. Notwithstanding the chirurgion herein is natures minister, and shall labour to bring the parte to his right temperature: and it so reduced to conserve it in the same estate.

Here we have a correct appreciation of débridement to which only amplification and finesse have since been added.

Frank B Berry

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Assistant Secretary of Defense
(Health and Medical)

NONGONOCOCCIC URETHRITIS IN THE MALE

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ABOUT two years ago I became interested in the large number of men referred to the venereal disease clinic for urethritis in whom the gonococcus could not be demonstrated, and in the unsatisfactory treatment methods then in use.

MAGNITUDE OF THE PROBLEM

From 1 July 1952 to 31 December 1953, 4,555 patients were referred to the venereal disease clinic of this hospital. Of these, 3,409 (74.8 percent) had urethritis; 40, syphilis; 73, chancroid; and 23 had lymphogranuloma venereum. The remaining patients were divided between those who were diagnosed as having balanitis, verruca acuminata, herpes, or other nonvenereal lesions of the genitals, and those in whom the evaluation of blood serologic reactions was doubtful. Of the 3,409 patients with urethritis, 1,736 proved, by smear and/or culture, to be due to the gonococcus and 1,673 (49 percent) could be classified as nongonococcic urethritis or nonvenereal urethritis. In the absence of precise definitions in Department of the Army Circular 87 for nongonococcic urethritis and nonvenereal urethritis, the diagnosis of nongonococcic urethritis was made in all instances in which the patient admitted sexual contact within 30 days of the onset of the first symptoms without the use of prophylaxis. Using these criteria, 95 percent of the patients in whom the gonococcus was absent were classified as having nongonococcic urethritis, and five percent as having nonvenereal urethritis. In this study there were no significant differences in the patients' symptoms or the response to treatment in these two groups. Throughout this article the term "nongonococcic" will be used to designate both types. All types of nongonococcal urethritis have been described by Harkness.[1] In addition to the types mentioned above, about 25 percent of the 1,736 patients treated for gonorrheal urethritis showed a primary mixed infection by gonorrheal and nongonorrheal organisms on their first visit to the clinic.

The discussion of the magnitude of the problem and racial distribution of cases deals with 1,736 patients seen between 1 July 1952 and 31 December 1953. All other studies are based on

From U. S. Army Hospital, Camp Kilmer, N. J.

1,277 patients seen between 1 July 1952 and 30 June 1953. The number of patients involved is stated in each table. The varying number of patients is dependent on the completeness of information on the particular item.

EPIDEMIOLOGY OF NONGONOCOCCIC URETHRITIS

Racial distribution of patients. An analysis of the racial distribution of cases of gonorrhea and of nongonococcic urethritis in which racial data were stated revealed the following results. Of 1,736 cases of gonorrhea, 78.1 percent occurred in Negroes and 21.9 percent in white men. By contrast, of 1,488 cases of nongonococcic urethritis, 50 percent occurred in white men and 50 percent in Negroes. In the absence of accurate population statistics by race for this camp during the period of this study, specific racial rates were not calculated; however, studies are being continued to determine the validity of the apparent relatively higher ratio of white men to Negroes for nongonococcic urethritis. Wagner and associates[2] found that, of their 84 patients, 69.1 percent were white and 30.9 percent were Negroes; however, the racial distribution of the population from which these patients were drawn is not stated.

TABLE 1. *Age distribution of patients with urethritis*

Age (years)	Urethritis	
	Nongonococcic (661 patients)	Gonorrheal (1,172 patients)
	Percent	*Percent*
17 to 19	5	9
20	11	16
21	13	17
22	15	18
23	16	12
24	17	10
25	7	6
26 to 32	13	10
Above 32	3	2

Age distribution of patients. Table 1 shows the age distribution of 661 patients with nongonococcic urethritis as compared with the age distribution of 1,172 patients with gonorrheal urethritis. Seventy-seven percent of the patients with nongonococcic urethritis, and 82 percent of the patients with gonococcic

urethritis were between the ages of 17 and 24 years. In the absence of specific data regarding the ages of the entire population of this camp, no comment is offered on the slight difference in the average age of the two groups.

TABLE 2. *Time between last sexual intercourse and onset of symptoms in 1,000 patients with nongonococcic urethritis*

Time (days)	Patients (percent)
1 to 3	8
4	10
5	6
6	4
7	6
8	6
9	6
10	4
11 to 15	13
16 to 20	7
21 to 30	12
30 to 90	12
Over 90	6

Venereal history. The question of whether or not nongonococcic urethritis is a venereal disease has received considerable attention in the literature within the past two or three years. Almost all writers believe that in most cases the disease is sexually acquired, and much evidence of its transmission has been recorded. Table 2 gives the time between the last sexual intercourse and the onset of symptoms in 1,000 patients with nongonococcic urethritis treated in this clinic. The data reveals that 94 percent of the patients admitted having sexual contact with women within three months of first reporting to this clinic. Many patients stated that symptoms of urethritis started a few days after the last sexual intercourse. Also, in a large percentage of the patients gonorrhea was acquired following the last sexual contact, and a residual urethritis followed as a sequel. Less than one percent of the patients denied having sexual intercourse within a year when reporting for treatment. Eighty-two percent of the patients with nongonococcic urethritis admitted having sexual contact within 30 days of the onset of symptoms.

Use of prophylaxis during exposure. During the first interview, about one out of three men with nongonococcic urethritis stated they used mechanical or chemical prophylaxis during or after their last intercourse; however, on further questioning, only rarely could a substantial story for the actual or correct employment of a prophylactic method be sustained.

Geographic location of contacts. The last sexual contact for 27 percent of the men took place in New York City, for 13 percent in New Jersey, for 52 percent in one of 31 different states in the United States, and for eight percent in such foreign countries as Germany, France, Austria, Japan, Korea, and Mexico.

Time lapse between last sexual intercourse and onset of symptoms. In an attempt to establish whether or not nongonococcic urethritis is a communicable disease, and if it is contracted during sexual intercourse, "incubation periods" were calculated on the basis of the number of days elapsing between the last admitted sexual contact and the beginning of symptoms. When this was less than five days, a history of other contacts prior to the last were frequently obtained; however, for the purpose of uniformity, all periods were calculated from the date of last exposure. Table 2, based on an analysis of 1,000 patients, shows the calculated "incubation periods." It will be noted that in 50 percent of the patients the last sexual contact occurred within 10 days of the appearance of the first subjective symptoms, in 63 percent it occurred within 15 days, and in 82 percent within 30 days. In the remaining 18 percent of the patients, the last exposure occurred from one to eight months previously. The latter group represented a large proportion of the patients in whom the last exposure resulted in the development of gonorrhea, with nongonorrheal urethritis following immediately after treatment for gonorrhea, or after a lapse of several days or weeks. It is believed that some of the patients who denied intercourse within the last three months were not giving correct histories.

CLINICAL MANIFESTATIONS

Previous history of gonorrhea. Forty-five percent of all the patients who had nongonococcic urethritis admitted having gonorrhea at some prior time.

Duration of symptoms. Table 3 shows the duration of symptoms given by 872 patients at the time of their first visit. Five patients had had symptoms intermittently for over a year, and in one patient symptoms and treatment extended intermittently for four years. Most of those having symptoms for over a month had been treated previously at other installations, many patients giving a history of more than 10 series of various treatments.

Consequently, in addition to any other classification of nongonococcic urethritis, a division into acute and chronic must be made. In this clinic, those infections of 30 days' duration or less have been arbitrarily classified as acute, and those of over 30 days' duration as chronic. Such a classification is important in determining the type of treatment indicated, the prognosis for cure, the development of complications, and the basis for referral of patients to the urologist. It is my belief that chronic infections usually involve complications and should be treated by a urologist. This clinic renders only medical treatments; no urethral instrumentations are performed. Prostatic examinations are made only when indicated to determine if complications are present which require the attention of the urologist. Using the criterion of 30 days' duration, it will be seen that the infection of 82 percent of our patients can be classified as acute.

TABLE 3. *Duration of symptoms in 872 patients*

Time (days)	Patients (percent)
1	28
2 to 5	40
10 to 20	10
21 to 30	4
Over 30	18

Previous treatment received. The histories of 426 patients who had received previous treatment showed that 90 percent had received penicillin intramuscularly, six percent had received sulfadiazine, and three percent had received aureomycin hydrochloride. A few patients had received streptomycin, oxytetracycline (terramycin), or chloramphenicol, and many had received numerous prostatic massages. Most of this group of patients had received two or more different drugs, and several had received five or six. Those receiving penicillin had received up to 20 injections. Because 90 percent of the previously treated patients had received penicillin with no relief, it is apparent that in nongonococcic urethritis the organism is penicillin-resistant.

Precipitating factors. In addition to the high percentage of patients who admitted recent sexual contact, the frequency of two immediately precipitating factors was impressive; namely, excessive sexual activity and bouts of heavy drinking of alcohol. Many men gave histories of daily sexual activities over a period of several days, with three or more exposures a day. Alcoholic

bouts consisted of unusually heavy drinking on a single day, or of more than average drinking over a period of several days. Further studies with controls are planned to determine if the sex and drinking habits of the average man differ significantly from patients with urethritis. "Milking" of the urethra after each urination is also a frequent precipitating factor. It is done by men who have exposed themselves without protection and who fear they have contracted a venereal disease. This procedure becomes a veritable compulsion, especially in the married man who has just returned from overseas and fears he may infect his wife. This manual manipulation produces a traumatic urethritis on which the normal saprophytic flora of the fossa navicularis may produce a purulent exudate. A case of traumatic urethritis was caused by the rough manual manipulation of the patient's penis. Patients attributed the onset of urethritis to various forms of unusual physical exertion, constipation, or to an upper respiratory infection. During the winter months, many patients concurrently had developed urethritis and upper respiratory infection. No comment is offered at this time as to a possible causal relationship, although Eisendrath and Rolnick[3] stated that acute catarrhal nongonococcic urethritis with a mucopurulent discharge is usually associated with catarrh of the upper respiratory tract. Keyes and Ferguson[4] stated that "gonococci, sexual indiscretion, and the tight anterior urethra or meatus are the usual causes for prolonged simple urethritis," and that urethritis due to sexual excesses is primarily a prostatitis.

SYMPTOMATOLOGY

The subjective symptoms reported by patients were various types of discomfort and pain in the urethra, glans, testicles, perineum, and inguinal regions. A difference in the symptoms were reported by patients with nongonococcic urethritis and those infected with the gonococcus; whereas in patients with gonorrheal urethritis the predominant symptom was a burning sensation in the urethra during urination, only a small percentage of patients with nongonococcic urethritis reported this symptom. The most frequent sensation reported by the latter group of patients was an "itching" or "tickling" in the urethra. This symptom is almost pathognomonic of nongonococcic urethritis, and when a patient with a profuse purulent discharge is first seen, the type of urethritis can be predicted with a high degree of accuracy on the basis of the urethral sensation alone. Harkness quotes Bockhart who, in 1886, experimentally produced nongonococcic urethritis and reported that itching in the urethra occurred 24 hours after inoculating the volunteer's urethra with staphylococci cultivated from the wife of a patient with urethritis. Other patients described the urethral sensation as "stinging," "smarting," "scraping," "burning," and "irritation." Although most patients com-

plained of discomfort during micturition, a considerable number reported symptoms independent of urination. These were sensations of discomfort, most frequently referred to the glans, meatus, and fossa navicularis. Patients used such terms as "a pinching at the end of the penis," "pain and soreness at the end of the penis," "pain in G-string after urination," or "slight burning inside the tip." A frequently reported symptom was difficulty in starting urination with a sudden release of urine as though a temporary obstruction was relieved. The number of patients who reported vague discomfort in the groins, testicles, and perineum was impressive. Also, 10 patients experienced frank pain and tenderness in the testicles, and five of these developed epididymitis. Three patients had terminal micturition hematuria prior to treatment.

DIAGNOSIS

Three types of urethral discharge were noted: (1) frankly purulent which was usually profuse, (2) mucopurulent in which the mucus was usually flecked with pus, and (3) a thin watery discharge. In addition, several men were referred to this clinic with urethrorrhea (an excess of normal mucus). However, this is usually due to milking the urethra, and if the milking process is continued a traumatic urethritis will develop. Many patients referred for treatment of a urethral discharge had only a phimosis and a balanitis, or an infected condyloma acuminatum. Proper cleansing and irrigation of the preputial sac revealed no discharge coming from the urethra. The patient with the usual acute infection (of less than 30 days' duration) of nongonococcic urethritis had a profuse purulent discharge grossly indistinguishable from that of gonorrhea; some however, had only a watery or mucopurulent discharge. In general, the patient with a chronic infection (over 30 days) presented a watery or mucopurulent discharge. The majority of patients with this condition gave histories of having had a "milky" discharge at the beginning of the disease or at some time during its course. Many patients with a chronic infection reported intermittent changes in the character of the discharge—from purulent to mucopurulent to watery and again to purulent. These changes were usually observed after varying treatments which gave temporary relief but with subsequent relapse. In the latter type of patient, the problem of reinfection must be considered.

MICROSCOPIC FINDINGS

Early in this study every precaution was taken to avoid confusing gonorrheal with nongonorrheal urethritis. Smears and cultures both on blood agar and chocolate agar were made. The accuracy of the smears in our laboratory was so high that routine cultures were eliminated and the diagnosis of nongonococcic ure-

thritis was made on the basis of the absence of the gonococcus in smear preparations. In this clinic, about 25 percent of all patients treated for gonorrheal urethritis showed, initially, a mixed infection. Because the technicians were not experienced in finding inclusion bodies of abacterial urethritis or in cultivation of pleuropneumonia-like organisms, these organisms do not appear in the list of microscopic findings; the 21 percent of the smears showing pus and epithelial cells but no organisms were from urethral discharge which usually showed no growth on blood agar or chocolate agar, and conceivably could be due to either virus or pleuropneumonia-like infections. The predominating organisms in the urethral discharge of 1,277 patients were various gram-positive cocci (usually hemolytic and nonhemolytic *Micrococcus pyogenes* var. *albus*), and gram-positive bacilli (usually reported as diphtheroids) (table 4). These organisms are

TABLE 4. *Organisms in urethral discharge found by direct smear and culture in 1,277 patients*

Organisms	Patients (percent)
Gram-positive cocci alone	9
Gram-positive cocci and gram-positive bacilli (usually diphtheroids)	55
Pus cells with few epithelial cells and no organisms	15
Epithelial cells with a few pus cells and no organisms	6
Miscellaneous organisms	15

frequently found in the normal flora of the male and female genital tract. The fact remains, however, that in urethritis these organisms are more numerous. Further study is needed to determine to what extent a patient's own saprophytic organisms may become pathogenic, or whether or not the pathogenic organism is transferred from the woman during intercourse. Among these various nongonorrheal species of neisseria such as *Neisseria catarrhalis*, members of the *Escherichia coli* group, *Aerobacter aerogenes*, alcaligenes species, *Streptococcus viridans*, *Micrococcus pyogenes* var. *aureus*, and proteus species were found. No attempt is made to ascribe causative roles to any of these organisms, and further rigidity controlled studies by qualified bacteriologists are planned.

TWO-GLASS URINE TEST

The most frequent finding in this test showed the first glass to be cloudy with many large shreds, and the second glass clear with no shreds; thus, this test indicated that in most of the pa-

tients the infection was limited to the anterior urethra. The two-glass test was a rapid and valuable method of observing the progress of treatment.

SENSITIVITY STUDIES

Nine hundred and thirty-one sensitivity studies were performed on organisms isolated by culture from 452 patients with nongonococcic urethritis. All organisms isolated were tested for sensitivity to penicillin, 400,000 units of penicillin G procaine and 0.5 gram of dihydrostreptomycin sulfate (combiotic aqueous suspension), and oxytetracycline. The sensitivity of a smaller number were tested with aureomycin hydrochloride.

Some of the results of the sensitivity studies are difficult to interpret when compared with the therapeutic results obtained in patients with the same antibiotic. In the sensitivity tests on 10 different types of organisms isolated it was found that 95 percent of all strains were sensitive to combiotic, 84 percent were sensitive to oxytetracycline, and 80 percent were sensitive to penicillin. An analysis of results showed that usually if an organism is sensitive to oxytetracycline it is very sensitive, and therapeutic results usually confirmed this by a rapid clearing of symptoms. The best results were obtained with combiotic; no strains of nonhemolytic staphylococcus and only six percent of the other organisms were resistant to it. The clinical results confirmed these findings and combiotic was the best single therapeutic agent for acute infections of nongonococcic urethritis. The sensitivity tests to penicillin were misleading. While about 80 percent of the organisms showed some sensitivity to this antibiotic, clinically penicillin alone was the poorest of all therapeutic agents tried. These paradoxical results are amplified when it is considered that 90 percent of the patients who had received prior treatment had been given penicillin with no curative results. Because most of the patients with nongonococcic urethritis had a mixed infection, clinical results apparently depended on the sensitivities of all organisms in a particular patient to the therapeutic agent used. The fact that 26 percent of all strains of diphtheroids showed resistance to penicillin and only three percent were highly sensitive to this antibiotic tends to substantiate this assumption. Wagner's[2] statement, "apparently the clinical response bears no relationship to the organisms isolated initially," is in accord with some of these findings.

PRELIMINARY EVALUATION

In this study, success in the treatment of patients with nongonococcic urethritis depended on the preliminary evaluation of three factors: (1) the duration of the symptoms, (2) the character of the discharge, and (3) history of predisposing and especially

TABLE 5. *Summary of treatment results in 977 patients*

Antibiotic	Number treated	Cured		Improved		Unimproved	
		Number	Percent	Number	Percent	Number	Percent
Penicillin	50	12	24	6	12	32	64
Sulfadiazine	50	18	36	12	24	20	40
Dihydrostreptomycin	30	12	40	6	20	12	40
Oxytetracycline instillation	55	46	84	5	9	4	7
Oxytetracycline, given orally	42	36	86	3	7	3	7
Combiotic with follow-up	250	168	67	75	30	7	3
Combiotic without follow-up	500	*	*	*	*	*	*

*See discussion under follow-up studies on page 1261.

the precipitating factors, such as excessive sexual activity, alcoholic drinking, and "milking" of the urethra.

A patient with such a history requires no medication if he has only a watery or mucoid discharge which on smear shows epithelial cells predominating with a few pus cells and a very few or no organisms. In such cases the patient should be instructed to avoid alcohol, sexual activity, eating highly seasoned food, and "milking" of the urethra. If the patient follows these instructions, his symptoms should subside in from three to five days. This is in consonance with Logue and Bird.[5] In some patients, however, the discharge becomes mucopurulent or purulent, and medication is required.

Patients with acute infection responded more rapidly to treatment than those with a chronic infection.

In the evaluation of therapeutic results (table 5), conclusions are necessarily limited by the relatively short follow-up period possible at a camp such as this one, where the majority of patients treated are transient personnel. The factor of reinfection also makes appraisal of treatment results more difficult.

TREATMENT

Penicillin. Despite the fact that about 90 percent of the patients in this series had been previously treated with penicillin without lasting result, we tested the efficacy of this antibiotic on 50 patients with new acute infection of nongonococcic urethritis, administering 600,000 units of penicillin G procaine in oil with 2 percent aluminum monostearate every 48 hours for two or three doses. As was the experience of Crouch and associates,[6] Graham,[7] and Babione and Graham,[8] it became apparent very early that penicillin was of little value, and 75 percent of the patients treated with it required retreatment with combiotic or oxytetracycline. In general, this is in accord with the experience of Logue and Bird. A few patients were made worse in that a watery or mucopurulent discharge was converted into a profuse purulent discharge while penicillin was being administered. Three patients hospitalized for other conditions developed a urethral discharge while taking penicillin for a nonurologic disease, a development also described by Graham.[7] Logue and Bird also reported that "a persistent nongonorrheal urethral discharge developed while several patients were receiving penicillin for gonorrhea."

Sulfadiazine. Experience with sulfadiazine was likewise very disappointing. Using this drug on an outpatient basis, the physician cannot be assured that the patient is taking the drug as prescribed. I believe that many patients' failure to take sulfadiazine tablets or oral antibiotic capsules as prescribed, stems

from their disappointment at not receiving a parenteral injection.

Dihydrostreptomycin. Better results were obtained in patients treated with dihydrostreptomycin alone than with penicillin but were found to be very inferior to combiotic.

Oxytetracycline. Ferguson and associates[9] reported the value of urethral instillations of oxytetracycline in chronic urethritis. Although their report concerned chronic urethritis, a series of patients with either acute or chronic nongonococcic urethritis were treated by instillations. At first, a 2.5 percent solution of "oxytetracycline intravenous" in normal saline was used for instillation into the urethra, but because of the discomfort felt by some patients the strength was reduced to 1.5 percent with good results. When oxytetracycline instillations were effective, the average number of daily treatments was five. Because of the time required for preparation of the solution and for holding the solution in the urethra, this procedure was reserved for the more chronic infections when combiotic was found so efficacious in acute cases. About 25 percent of the patients given such instillations developed a mild hematuria during the course of treatment. These patients usually had complications which necessitated referral to a urologic clinic. Oxytetracycline by oral administration of 250 mg. every four hours for from five to seven days was also found to be effective. The medication was usually discontinued in those patients developing gastrointestinal symptoms. The present policy is to use oxytetracycline orally for patients with chronic urethritis and in those with acute urethritis when combiotic fails.

Based on sensitivity studies and the work of Leberman and Morton[10] oxytetracycline has proved effective against almost all organisms found in nongonococcic urethritis.

Combiotic. Combiotic aqueous suspension is a ready-mixed product containing in each 2 cc. dose 400,000 units of penicillin G procaine and 0.5 gram of dihydrostreptomycin sulfate for intramuscular injection. The synergistic action of penicillin and dihydrostreptomycin in this preparation far exceeds the efficacy of either antibiotic alone. This is borne out by studies of clinical failures with the latter two antibiotics when used separately, and the uniformly good results obtained with combiotic. Because of results obtained in 750 patients with nongonococcic urethritis and 300 patients with mixed gonorrheal infections, combiotic is considered the treatment of choice for all patients with acute nongonococcic urethritis and mixed gonorrheal infections, regardless of the laboratory findings. The more purulent the discharge and the more recent the infection, the more rapid was the disappearance of symptoms. Optimum dosage was found to be two daily

doses of 4 cc. given intramuscularly (equivalent to 800,000 units of penicillin G procaine and 1 gram of dihydrostreptomycin sulfate daily). A few patients required a third dose, and it was found that if three doses did not produce results, neither would a larger number. In most patients, the urethral discharge stopped completely within 24 hours following the first injection. Only one reaction (urticaria) was encountered in more than 1,000 patients.

FOLLOW-UP STUDIES

Combiotic-treated cases without follow-up. Due to the transient nature of the patients, accurate long follow-up periods were not possible. In one large group of patients no follow-up was possible, but I believe that failure to report for checkup was significant. In this group of 500 patients with acute nongonococcic urethritis, usually with a profuse purulent discharge, one dose of 4 cc. of combiotic was administered and the patient advised to return in from one to three days for checkup. None of the 500 returned, and this was interpreted to mean that the symptoms in most of these patients had stopped with one treatment because a man with a persistent urethral discharge, pain, and discomfort is usually anxious to obtain treatment as long as the symptoms continue. When follow-up was possible and the discharge did not stop within the first day, the patient continued to return until cured. The assumption that these patients were cured was substantiated when an analysis revealed that most of them were scheduled for overseas shipment. A man scheduled for shipment will usually make every effort to obtain a cure or relief from his symptoms before going overseas. A few of the 500 patients received orders transferring them from this camp before their next scheduled return to the clinic, but in most cases these men were still in camp and could have reported for a checkup. Those of this group who were scheduled for separation from the service at this camp did not have an urethral discharge when they appeared for a final type physical examination, or they would have been referred back to this clinic.

Combiotic-treated cases with follow-up. Two hundred and fifty patients with nongonococcic urethritis were observed (for periods of from four to 30 days following treatment) twice weekly, and it was found that 66.4 percent of the patients were completely cured, and 30.0 percent were greatly improved. No change occurred in 2.8 percent of the patients, and 0.8 percent became worse. If all patients could be observed for longer periods, it is believed that the percentage of complete cures would be much higher. In those patients who showed no change or became worse, referral to a urologic clinic revealed prostatic involvement or other complications.

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COMPLICATIONS AND ASSOCIATED PATHOLOGY

Prostatitis was the most frequent pathologic condition associated with nongonococcic urethritis, especially in those patients in whom the duration of symptoms existed more than 30 days before reporting for treatment. Five patients with acute epididymitis were seen from whom smears and cultures were negative for the gonococcus. The five were hospitalized and treated with combiotic, and received prompt and complete cure. Three patients had hematuria prior to treatment. Many cases of nongonococcic urethritis were seen in association with other infections such as balanoposthitis, verruca acuminata, and chancroid.

Unknown factors in nongonococcic urethritis requiring study. The most important question from the point of view of preventive medicine is which cases, if any, of nongonococcic urethritis are sexually acquired. A survey of the urologic and gynecologic literature reveals evidence which strongly supports the view that a large proportion of infections result from sexual intercourse. Curtis and Huffman,[11] in their chapter on nonspecific infections, stated that many women with urethral or cervical discharge acquire the infection by sexual contact with men suffering from postgonorrheal urethritis. They have isolated essentially the same types of organisms from women that have been isolated from men in this study.

Herman[12] believed that in men the most frequent source of urethritis due to the staphylococcus group is intercourse with a woman suffering from a leukorrheal discharge, a condition which seems to be especially infectious to men. Harkness cited abundant evidence for the natural and experimental transmission of these infections.

Patients with chronic nongonococcic urethritis are concerned about sterility. In this regard, Harkness reported that he "isolated 'L' organisms in both men and women during investigations for sterility."

Investigation is needed to determine to what extent women harbor the various types of nongonococcic organisms in the genitourinary tract, and under what conditions these organisms produce disease.

Because various species of staphylococci are present in this disease which is very prevalent, the possibility of these organisms serving as the causative agent for staphylococcic food poisoning arises. Toxicity studies should be made on strains of staphylococci isolated from patients with nongonococcic urethritis in an attempt to determine the enterotoxin-producing ability and potential ability to cause food poisoning. If the

staphylococci found in urethritis do produce enterotoxin, then it is more important to prevent patients with this disease from working as food handlers than it is those with gonorrhea. Anticipating this possibility, patients were instructed to avoid food handling.

Primary mixed infections by gonorrheal and nongonorrheal organisms. An adequate study of nongonococcic urethritis cannot be made without a consideration of mixed infections in which, besides the gonococcus, the same types of organisms found in nongonococcic urethritis are found in smears and cultures. This is especially true of staphylococci found in association with the gonococcus. Because 45 percent of the patients with nongonococcic urethritis gave a history of previous gonorrheal infection, the role of the latter infection in nongonococcic infections was investigated. All patients with gonorrhea were studied three days after treatment. The smears in about 25 percent of these patients were then negative for gonococci, but a urethral discharge in which gram-positive cocci and bacilli were found in large numbers continued. Retreatment with penicillin did not eliminate this type of discharge. However, treatment with combiotic or orally administered oxytetracycline caused the disappearance of the gram-positive cocci and a clearing of the symptoms.

The laboratory was then requested to give a complete reading of all smears positive for the gonococcus, and to include a description of all organisms found and their relative proportion as compared to the gonococci. All smears showing a large percentage of organisms other than gonococci were defined as showing primary mixed infections by gonorrheal and nongonorrheal organisms. The importance of this study lies in the fact that, if all patients with gonorrhea showing a mixed infection at the first visit are treated initially with combiotic, very few will require further treatment. Studies are being continued to determine the minimum percentage of nongonorrheal organisms which must be present to justify a diagnosis of a mixed infection. A large proportion of all patients with gonorrhea will show some mixed organisms. My general impression is that those patients showing somewhere between 25 and 50 percent of nongonorrheal organisms require retreatment when penicillin alone is used. I believe serious consideration should be given to the use of combiotic instead of penicillin in the initial treatment of all patients with gonorrhea. This procedure would prevent most patients from developing postgonorrheal urethritis.

Administrative consideration of nongonococcic urethritis. The incidence of nongonococcic urethritis, when compared to that of the five reportable venereal diseases, does not show the over-all

importance of the disease. It is paradoxical that gonorrhea and syphilis, which before the introduction of antibiotics required much of the time and expense of medical treatment facilities, are now relatively simple problems. By contrast, nongonococcic urethritis is a major problem because of (1) the large number of previous treatments reported by patients with chronic urethritis, (2) the cost of large quantities of expensive antibiotics and other drugs used, (3) the unsatisfactory results of treatment of patients with chronic infections, and (4) the mental attitude developing in patients as a result of the prolonged course of treatment and the uncertainty of cure in many cases.

Wagner and associates confirm the last point in stating that the syndrome of nongonococcic urethritis is often made worse by certain mental states. The emotional component of this disease is manifested in several ways. A patient becomes anxious when told that, although he does not have a "venereal disease," there is no assurance of a rapid cure. An outstanding symptom of this anxiety is the constant "milking" of the urethra to note the progress of the disease, thus traumatizing the mucosa and aggravating the infection. A severe form of anxiety, associated in some instances with a mild form of depression, is frequently seen in the married man with this disease, especially if he has just returned from overseas and he fears the consequences of returning to his wife with urethritis. Such a patient expects positive answers to his questions regarding the infectiousness of the disease, the probability of producing sterility in either himself or his wife, the development of impotency, the effect on his general health, the duration of the disease, et cetera.

Because there are several different diseases under the heading of nongonococcic urethritis, uniformity in diagnosis is needed. It is urgent that definitions be established for (1) each type of the disease, (2) the criteria for labeling an infection acute or chronic, and (3) the criteria for determining whether or not it is of venereal origin. To determine this investigation of the sexual contacts of patients with nongonococcic urethritis should be started on a pilot basis in one or more localities where good co-operation of the local health authorities can be assured.

SUMMARY AND CONCLUSIONS

Nongonococcic urethritis is an important problem at this camp, which, as a personnel processing center, handles large numbers of transient personnel. It required more medical attention than the five usual venereal diseases. No direct evidence is offered to substantiate nongonococcic urethritis as a venereal disease; in fact, adequate proof that all types of this ailment are infectious diseases is still lacking.

Epidemiologic studies show that there is an apparent racial difference in the incidence of this disease, white men showing a relatively higher ratio than Negroes, in contrast to the reverse incidence of gonorrheal urethritis. Seventy-seven percent of 661 patients were between the ages of 17 and 24. Ninety-four percent of 1,000 patients admitted sexual intercourse within three months of the onset of their symptoms, and the places of their last sexual contact were located in 33 states and six foreign countries. The time elapsing between the date of the last sexual intercourse and the onset of symptoms was less than 10 days in 50 percent of these patients and less than 30 days in 82 percent.

Forty-five percent of all patients with nongonococcic urethritis admitted having gonorrhea at some prior time and the latter disease appears to be a prominent predisposing factor in one type of the ailment. Precipitating factors were excessive sexual activity, excessive drinking of alcoholic beverages, and "milking" of the urethra.

In 82 percent of the patients with infections classified as acute, symptoms were present for less than 30 days before reporting to the clinic. In 18 percent, symptoms were usually present for from one to three months or longer, and the infections were classified as chronic.

Of those patients who had received treatment prior to reporting to our clinic, 90 percent had received penicillin without curative results.

The most prominent subjective symptom reported was a tickling or itching sensation in the urethra. The urethral discharge was usually profuse and purulent in the patients with acute infections and mucopurulent or watery in those with chronic infections.

Several types of micro-organisms were found on smear and culture, the most frequent being hemolytic and nonhemolytic *M. pyogenes* var. *albus* and diphtheroids. Further study is needed to determine which types are acquired and which types cause autogenous infection. In 21 percent of the patients, no organisms could be found.

Sensitivity studies to antibiotics are confusing and do not parallel therapeutic results.

The treatment of patients with acute nongonococcic urethritis is a great deal more satisfactory than treatment of those with the chronic type. It is believed that the marked difference between the two groups is due to the frequency, in the chronic type, of complications and associated pathologic conditions—especially prostatitis. Combiotic produces excellent results in the treat-

ment of patients with the acute form. In chronic infections the best results were obtained with oxytetracycline given orally or by urethral instillation. The study of primary mixed infections with gonorrheal and nongonorrheal organisms suggests the revaluation of penicillin in the treatment of gonorrhea. The initial use of combiotic in mixed infections was found to eliminate both infections in a greater proportion of patients than did penicillin alone.

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CANCER OF THE STOMACH

What is the curability of gastric cancer? The question is of some importance to mankind, in view of the fact that among malignant diseases stomach cancer still remains one, if not the, chief cause of death. Figures from Great Britain reveal that 14,409 deaths due to stomach cancer were reported during 1952 for an estimated population of 43,940,000. These figures are in line with the estimate that 40,000 people die of cancer of the stomach each year in the United States. The magnitude of the problem demands serious thought and action on the part of every physician.

—EDWARD E. MASON, M. D.
in *Journal of Iowa State Medical Society,*
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UNDERSTANDING THE "FEAR OF FLYING" SYNDROME

II. Psychosomatic Aspects and Treatment*

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IN any discussion of the effects of fear and anxiety on human behavior and performance, a consideration of the manner in which these destructive emotions can produce the symptoms of physical disease, real or simulated, is essential. The frequency with which such extreme symptoms appear in the "fear of flying" syndrome, as in any combat or stress reaction, clearly illustrates the need for a close liaison between medical, psychiatric, and administrative authorities. It will also be seen that this combined approach facilitates detection and treatment of psychiatric and psychosomatic conditions which previously may have defied the efforts of any single agent—whether medical, psychiatric, or administrative. A review of the advantages and defects of past therapeutic and preventive technics reveals many clues of future value in shaping and carrying out adequate and realistic measures of prevention.

PSYCHOSOMATIC MANIFESTATIONS OF "FEAR OF FLYING"

Meaning of "Somatic Compliance." Frequently during an early tour of combat, flying personnel come to the physician or flight surgeon because of various somatic disturbances or physical complaints which, although they may be supported by a certain amount of organic pathology, appear to produce a degree of incapacity far in excess of the physical findings. If during the incipient stage the physician or flight surgeon recognizes that this "somatic compliance" is the expression of anxiety related to underlying conflicts, frustrations, and ambivalent emotions which have been channeled into physical systems, he is best able to treat psychosomatic difficulties and to resolve emotional problems. The early discovery of the emotional meaning of such physical symptoms will prevent the loss of flying personnel through fixation on medical complaints and through the use of supposed physical incapacities to obtain secondary gain.

Somatic Manifestations of Emotional Conflicts. When men with strong superegos are bombarded constantly by internal and

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external conflicts, severe somatizations may occur. In the following case the conflict between the patient's desire to give up flying forever and his fear of being accused of failure, a dilemma which seemed insolvable, caused a violent gastrointestinal reaction.[5]

Case 13. Psychogenic gastrointestinal reaction. Because he had failed economically in civilian life, a 31-year-old married navigator requested return to active flying status shortly after the outbreak of the Korean conflict, although he had little true motivation for flying. He had not been trained for any civilian career in which he could expect advancement to high paying positions. The greater financial gain which he would accrue by returning to military duty as a captain on flying pay appealed to him very strongly. After a delay of several months he was recalled. During his retraining period as a navigator, however, he developed uneasiness and anxiety over his capabilities. Despite these misgivings he continued his duties because "I thought I would get over this upset feeling." Shortly after arriving overseas for combat duty he realized that his remaining inclination for flying had completely vanished. Despite this he flew 12 missions before he collapsed completely during an early morning briefing. On several occasions during the 12 missions, he had developed severe nausea to the point of vomiting and had become so weakened that he could not perform his navigation duties adequately during flight. At these times he felt confused and actually disoriented. Because of his collapse, he was sent to the hospital, but all physical findings were essentially normal. Gradually, in discussions, it became evident that he had feared failure and loss of prestige in the eyes of his comrades so much that he could not openly quit flying, so his only escape was to develop severe cardiovascular and gastrointestinal reactions. At first it was very difficult for him to comprehend that his "somatic compliance" was an expression of his need to fail and yet to save face. As the senior captain he had been expected to assume the duties of the lead navigator, which would have meant assuming many responsibilities and the leadership of the younger navigators who should be able to regard him with great confidence and respect. This combined fear of responsibility and of failure in the eyes of others, conflicting sharply with his deep dependent need to give up duties for which he no longer cared, caused a physical reaction so marked that it became necessary to ground him. It was evident that despite this man's conscientious attempt to force himself to accept flying again as a military career, his whole organism revolted violently. The best solution was to ground him for a period and give him an opportunity to work through his underlying conflicts. Through psychiatric assistance he gradually became aware of the meaning of his emotional disturbances and willing to accept whatever action might be indicated. Because in reviewing his total situation it was believed that he would not make a suitable adjustment to military flying, the recommendation was made to ground

him for a true neurotic reaction ("psychogenic gastrointestinal reaction, severe"); thereafter, he was either to be placed on ground duties or, if administrative decision deemed it best, to be separated from the service without dishonor. In situations like this, where the man sincerely tries to accept flying, punitiveness might cause harmful sequelae. This man's previous excellent World War II record should not be stained because of an emotional failure of this kind.

Frequently it is possible to make use of a strong superego to motivate an otherwise unmotivated pilot to continue flying. Such a man will continue to accept flying duties because his fear of the scorn of others and his own sense of personal integrity will not allow him to quit. His need to develop a physical ailment which would excuse him from flying duty should not be considered a subterfuge or malingering, particularly if a strict superego is apparent.[5] In its presence, burdensome obligations or duties can be given up only through a physical or emotional breakdown. This may be more clearly understood if the following case is considered.

Case 14. Suspected hyperthyroidism masking "fear of flying" syndrome. A 33-year-old married first lieutenant had been recalled as a pilot from the National Guard. He possessed an excellent World War II record as a pilot in multiengine planes. Between World War II and the Korean conflict he had married, and now had two children; also, he had completed his college training and was employed as a high school teacher in industrial arts. In his National Guard status he had been teaching engineering at a nearby air base. Upon his return to active duty, he was assigned to continue these duties and was even promised that he would remain in this assignment for his entire tour of military duty. Several months after his recall, however, he found that his name had been added in ink to an already published military order listing pilots selected for B-26 training and overseas duty. He was deeply hurt by this transfer, and resented the military for not keeping its promise. Throughout his B-26 training, which included night flying, he constantly resisted his assignment to this type of flying, and tried to influence his instructors with such statements as "I can't fly B-26's at night, I don't have enough instrument experience to be able to fly in severe weather." Nevertheless, because of his personal integrity and strong superego, he continued to make sufficient progress so that he was graduated as fully capable of flying B-26's. He made no further effort to get out of his flying duties at that time, but shortly after arriving overseas, before attempting even one mission, he showed such physical anxiety and tremor that he was transferred to an Army hospital as a probable case of hyperthyroidism. After 17 days of thorough evaluation, during which he was found to have no organic disease of any kind, he was transferred to an Air Force facility for further review and disposition. At this point he revealed his marked disinclination for flying, especially for flying B-26's, and ventilated his marked

resentment over the maltreatment he believed himself to have undergone at the hands of the military. Although at the time of his psychiatric review at an Air Force hospital no true anxiety was evident and his tremor had completely disappeared, he stated he would refuse to fly. After he had been given the opportunity to review his emotional problem completely in the light of his military situation and in accordance with the technic described above he was returned to military duty, either to accept flying or to face administrative action for separation. It was interesting to note that when he returned to duty he resumed flying because he "did not want his two daughters to think that he might be a failure" if he were to face the punishment of administrative separation, and the loss of his commission and pilot's wings. He then accomplished 30 missions without difficulty. During a leave of absence he apparently indulged excessively in alcohol and underwent sexual experiences that were not in keeping with his moral and social pattern of behavior. Shortly thereafter he developed a brief post-alcoholic hallucinatory state in which he believed his comrades and other persons were making him the butt of pranks and of sexual advances. Upon psychiatric review it was evident that this hallucinatory state was a brief but dramatic demonstration of a severe superego reaction precipitated by his failure to live up to his strict moral standards. He recovered quickly, showing no other evidence of personality disintegration or of mental derangement, and even though he still had no great motivation for flying, he again returned to flying and completed his combat tour.

Comment. Certainly this type of person might better not have been recalled originally to flying duties, but once he had accepted such a status it was natural to expect that he should accomplish his duties effectively. That he did so, despite temporary somatic and emotional disturbances, indicates that his personal integrity demanded his compliance with authority. In this instance, following the resolution of somatic and emotional disturbances, the diagnosis would best be "no psychiatric or physical disease present, qualified for full military duty including flying," so that if the man decided to give up flying his disposition would be administrative. Despite failing motivation for flying, however, the man with a strong superego would more than likely accept flying duty quite readily if a small "police action" like Korea were to spread into a worldwide conflict. In such a situation the reality demands of the Air Force and the goals that it pursues would provide an adequate challenge. Because the mission of war would be a serious one imperiling our own nation, the attitude of the Air Force toward "fear of flying" would be more severe, and the man's own personal honor, integrity, and conscience would force him to live up to his obligations. Much as we might desire it, however, this would not relieve us of the problem of "fear of flying," but it would stabilize the attitudes of

many men who might otherwise be influenced by other forces to react differently.

A strict superego can also prevent a patient from facing his conflicts, and be instrumental in producing a psychiatric or psychosomatic disturbance which becomes woven so inextricably into the personality structure that even psychotherapy may fail. It also can relieve such a disturbance in order to make a patient effective again. Its dual role appears clearly in the following two cases. In the first, failure to recognize either the man's basic emotional conflicts surrounding flying or the strength of his superego which prevented him from taking definite action led to such a fixation of physical and mental attitudes that he was rendered ineffective, not only as a flying officer, but in any military capacity. In the second, psychiatric understanding of the underlying difficulties and recognition of a well structured superego resulted in aiding a well motivated man to continue his flying duties successfully.

Case 15. Fixation of psychogenic musculoskeletal reactions. A strapping six-foot, 32-year-old regular Air Force pilot had suffered multiple contusions and subcutaneous hemorrhages in a B-26 crash in Korea. At the time of the accident, he had remained conscious and was quite emotionally upset because he was unable to help a more seriously injured crew member. When hospitalized there was no evidence of any severe internal or external injury, but he soon became "black and blue all over." This he claimed produced a severe itching and aching of his entire body, and rendered him extremely anxious, agitated, and difficult to handle. After transfer to a larger hospital, despite various medical therapies, he indicated he received relief from this itching and aching only by lying in a tub of warm water for long periods of time. After one month he appeared fully recovered, from a medical viewpoint. Because of the severity of his total reaction, he was transferred from Korea to Japan and given administrative duty requiring only the minimal amount of flying. At this point it should have been recognized that he was suffering from great emotional tension, a reaction precipitated to a great degree by his aircraft accident. Over a period of months, however, he continued to be moderately ineffective, complaining of the persistence of vague aches and pains, feelings of lassitude, and an inability to participate in any activity requiring even a minimal amount of physical exertion. At the same time he complained of difficulty in concentrating, feelings of confusion, and a marked inertia which frequently made him procrastinate and delay in performing certain inspection duties that infrequently required his flying as a passenger to various parts of Japan and Korea. Because of his persistent complaints he was examined repeatedly, yet no one could find any pathological condition which would explain the marked degree of his complaints. While it was agreed that in his accident he probably

had sustained multiple minor hemorrhages, not only subcutaneous but also into muscle tendons and internal structures, it was believed that almost a year later the residue would be minimal. Finally, about one year after his original injury, because of the evident discrepancy between the physical findings and his many complaints, he was examined psychiatrically, and it became evident that he had developed a marked fixation to the point of a severe psychogenic musculoskeletal reaction. In discussions it became evident that his feelings toward his military career and flying status had always been markedly indecisive and ambivalent. While he had a good record in World War II and was a regular Air Force officer, his promotions had come very slowly; whereas many of his contemporaries were of higher rank, he was still a captain. There were indications that in the past his administrative abilities and leadership qualities had never been highly regarded. Although he appeared to be big and powerful (his background revealed that he had been a football player in college and he described himself as one who "could never accept defeat"), in reality he was mild mannered and nonaggressive. While he could be aggressive on the football field, he was really shy and sensitive in his interpersonal relationships. It also became evident that he actually had desired to give up flying, but his strict superego would not permit him to do so. Consequently, he remained in a state of ambivalence and anxiety, and eagerly grasped his original musculoskeletal injuries as a focal point on which he could blame his difficulties in making an adjustment. This ambivalent and undecided state is clearly illustrated by his statements: "I require long hours of sleep. I feel tired all the time. I want to quit, yet I don't want to quit. I make myself do it. I won't admit defeat, but I even start hurting before I wake up." While unconsciously he did not feel adequate to take responsibility, his most pressing conflict, as is true for many officers in the Air Force, revolved around what would happen to his future Air Force career if he were to give up flying completely. This in his mind meant subservience to other flying officers, loss of prestige, and less opportunity for advancement to command positions. While he was really not a leader, success to him required being one.

In this case it is firmly believed that if this man had been approached from a total viewpoint shortly after his recovery from his severe accident, simple psychotherapeutic measures might have helped him understand his emotional conflicts and perhaps have prevented him from becoming as incapacitated as he felt. Again, psychotherapy might have helped him recognize how many of his unconscious fears concerning responsibility and group status were now manifesting themselves in the physical symptoms that prevented him from functioning successfully as a flying officer. His severe superego would allow him to accept no defeat other than a physical illness, through which the medical service could absolve him from any blame for his failure. At the late date of his psychiatric review, however, because any attempt to help him resolve his conflicts or to dissociate them from his physical

being was met with great emotional resistance, it became necessary to ground him medically because of his persistent psychogenic musculoskeletal reaction, and he continued in his administrative duties. His superego would not let him recognize the true cause of his present inertia or the meaning of his physical impairment.

In many instances, especially in relation to the "fear of flying" syndrome, some medical officers fail to recognize the real meaning of various complaints, and "sing in harmony" with the patient through repeated valiant attempts to find an organic reason for the disturbance. At times many men have been grounded for excessively long periods because of repeated examinations, unnecessary tests, and frequent transfers to different hospitals. This delays necessary final decisions in many simple cases where often no true underlying organic pathology can be found to explain the symptomatology. It is also a disservice to the fliers who, instead of being helped to face their conflicts, are encouraged, under the guise of a diagnosis of physical illness, to persist in their behavior. This is well illustrated by the case of a pilot, grounded for over two months, in whom no real incapacitating organic pathology was ever uncovered.[5]

Case 16. Vague physical complaints cause unnecessarily prolonged grounding. Following the completion of only two missions in T-6 aircraft, a 32-year-old married, recallee pilot reported to the flight surgeon complaining of blurred vision, difficulty in reading the instrument panel, and difficulty in depth perception which gave him trouble on making landings. He also complained of lassitude and loss of appetite, and difficulty in sleeping. Because his duties called for low altitude observation of enemy positions and personnel on the front lines, it was necessary for him to maneuver his plane constantly in order to avoid damage or injury from enemy gunfire. Upon examination the flight surgeon could find nothing wrong with this pilot's eyes or depth perception, and attempted to reassure him; however, the pilot was sure that some physical disorder was present. Several days later, while still temporarily grounded, he complained of severe headaches and pain in his nose and sinus. These complaints caused him to be grounded repeatedly for tests and retests; he was even flown to one major hospital for a complete eye examination, and to another for a complete ear, nose, and throat evaluation. Diagnoses and opinions concerning his complaints were vague and conflicting; in reviewing all the physical findings described in his abundant medical records, no truly incapacitating pathology was ever found. In one instance, even though the report of the physical examination did not reveal evidence of nasal congestion, inflammation, or excessive discharge, the diagnosis of allergic rhinitis was made. Although brief mention was made in several instances of the possibility that his difficulties might be emotional, he was not sent for complete final psychiatric and physical evaluation until his case was brought to the attention of higher medical

authorities. In the face of conflicting medical reports, his undecided status left his immediate superiors uncertain as to how to use him in any suitable job. Though masked by somatic complaints, the role played by emotional conflict in this man's "fear of flying" was finally established. As soon as he understood that his physical complaints were not supported by physical evidence and that perhaps other conflicts were affecting him, he demonstrated great resistance toward further understanding of his symptomatology. Psychotherapeutic discussions over a period of 10 days and a tactful presentation of his situation resulted in complete understanding of his behavior, and he finally expressed his willingness to return to Korea either to accept flying or to face administrative action. Prior to this, when he thought he might be forced to return to flying, he had stated, "If I have to fly T-6's it will be at a disadvantage because of my eyes and headaches. I don't think it will work." He originally had asked to fly C-47's, because in this duty he would have a co-pilot who could check him in case he developed trouble with his vision. Investigation revealed that this officer claimed he had only been trained to be a C-47 pilot, so when he was chosen to fly T-6's he could not understand the rationale of this assignment. In addition, he was concerned to find that his duties as a T-6 pilot also included a period of ground duty, as an air-ground liaison observer for his unit, at the front lines with artillery units. He had been recalled to active duty involuntarily and resented leaving his family and a lucrative civilian position. Much more important was his reaction to the fact that by the time he received his overseas orders he had only about seven months of his tour of duty to complete, and by the time he arrived overseas he actually had less than six months to complete before discharge. At that time anyone who had six months or less remaining ordinarily would not have been given overseas orders. His immediate assignment to the front lines meant facing combat and possible death for the remaining few months of his military tour. He resented deeply the fact that other pilots with many more months of service to render remained in the states, and believed that he had been sent over to do their job. When telling of three C-47 pilots who had been transferred to single engine aircraft against their personal wishes and killed during training, he revealed that his confidence in himself and in single engine aircraft was shattered. These conflicts in relation to authoritative control forced him to seek illness so that he could fail in flying without losing prestige within his group. His need to be ill as an excuse from flying is clearly a necessary defense against being considered a coward. The indecisive results of his many examinations, partly determined by his influence over the physicians, only served to fix in his mind the idea that some physical disease must be present. It was evident that, to avoid working out his reality conflicts, this pilot had to find something wrong with himself. Upon conclusion of his treatment, however, though still voicing resentment over his lot and some envy toward men in comfortable positions in the United States, he demonstrated a better

attitude toward his flying duties. He was further advised that when he returned to Korea he should discuss his total situation frankly with his flight surgeon and the commanding officer of his squadron. He was then returned to his combat base with the final diagnosis, *"No disease found, fully qualified for military duty, including flying."* Later reports indicated that after a serious conference with his commanding officer and flight surgeon he returned to his flying duties and had no further difficulty.

Comment. In this case it is evident that repeated delays and procrastinations in obtaining final medical and psychiatric decisions had served to keep this pilot needlessly grounded for so long a period that he might never have returned to flying. In evaluating the total situation, the medical, psychiatric, and administrative aspects stand out clearly. Although medical opinions were vacillating, firm and decisive psychiatric attitudes helped the pilot to face his administrative problem and return to effective duty.

The combined medical, psychiatric, and administrative approach, as demonstrated above, can always help officers in command decide how far punitive or disciplinary measures should go. The attitude of the Air Force toward the total problem should be a flexible one, depending not only on a man's visible behavior but also on the reality factors revealed, the conflicts found, his personal integrity, the underlying motivation, and, last but not least, the actual mission of the Air Force at the time the problem appears.

Somatic Manifestations of Defective Personality Structure. When it is seen that a man's lack of motivation for flying stems from a defective personality structure, demonstrated either through basic inadequacies or by lack of loyalty toward the group or himself, the medical officer and administrative authority should work closely together to arrive at a sound decision regarding his disposition. Such men also develop the "fear of flying" syndrome and must be handled appropriately. A consideration of the following case reveals clearly the action to be taken; it also demonstrates how the presenting symptomatology may change its form as rapidly as did the old man of the sea.[5]

Case 17. Variation in symptomatology in basically inadequate pilot. Two months after his marriage a 24-year-old second lieutenant pilot arrived in Korea for combat duties, but immediately complained of severe headaches which made it impossible for him even to start his B-26 fighter-bomber combat training. He presented his symptoms with such apparent sincerity that he aroused medical concern when he revealed that about 14 months earlier he had struck his head and had been "unconscious for a few moments" in an aircraft training accident. Despite the fact that he had not suffered any subsequent difficulty in performing his

flying duties in the United States, his complaints were so convincing that they resulted in his undergoing a complete medical and neurologic review in an Army hospital, lasting several weeks. All findings, including skull roentgenograms, laboratory studies, and electroencephalograms, were considered normal. He was therefore sent to the Air Force processing center for return to his combat unit in Korea. Here he immediately presented such bizarre behavior and confused thinking that he was admitted to an Air Force hospital because of a suspected psychosis. In this hospital it quickly became evident that his behavior was largely assumed and considerably motivated by his desire to avoid returning to Korea and combat flying. There was no evidence of any real anxiety. He would repeatedly approach the physicians with mildly eccentric behavior, and in his discussions he would talk of worries over masturbation and fears of homosexuality. He would assume infantile positions in bed and act disinterested and withdrawn, but was easily aroused from these states. There was no evidence of any true psychotic disturbance or emotional conflict beyond that of accepting his military obligations. Review of his earlier life revealed that, although he was intelligent and had been capable of becoming a pilot, he had never really made a good adaptation to anything in the past. His only motivation for learning to fly was the desire to avoid serving in the infantry. During psychiatric treatment he maintained a negativistic approach to the solution of his problems, but when he realized that his behavior and his underlying inadequacies failed to obtain his release from his obligations, he gradually gave up his pseudopsychotic behavior. He was returned to Korea with the diagnosis, "No physical or psychiatric disease found, fully qualified for military duty, including flying," together with a full report of his background and behavior. One month later, because on his return to Korea he had again refused to fly and was now facing administrative action and separation, he was referred for a final psychiatric evaluation. During this examination he was found to be cheerful and superficially co-operative, and showed no evidence of any disturbed behavior. He stated frankly that he was through with flying and his problems were solved. He showed no evidence of remorse over failing to live up to his military obligations, and demonstrated that he was a person who sought only to satisfy his personal selfish ends. He felt no concern toward the needs or feelings of others and no real loyalty to the group.

Comment. The evolution of this case should constantly be kept in mind by medical officers because it reveals how vague symptomatology can lead to long investigations and how rapidly symptoms may change as one by one they are taken away from the patient. It is possible, however, that, had the meaning of this man's original complaint of headache been recognized and had he been evaluated both medically and psychiatrically while at his own duty station or within its immediate vicinity, he might have been led into accepting his combat flying duties despite his underlying inadequacies, poor motivation, and well demonstrated

lack of loyalty. Many such men, if handled firmly, decisively, and with tact at the site of their combat duties, can be motivated by external authority to live up to the requirements demanded; however, if the man can produce behavior disturbing enough to cause his relief from his assignment, he can then give up his obligations with no real sense of having done wrong. While such behavior could result in more drastic punitive action than mere administrative separation—when, for example, the military mission is of extreme importance as it would be in total warfare—the best solution, as in this case, is to remove him from flying duties and deprive him of his commission, because it is clear that he does not possess the proper qualifications or integrity desired in officers. Whether he is returned to the military service in an enlisted status again depends on the total military situation.

The combined administrative, medical, and psychiatric understanding of each problem will usually determine the best avenue of action. From time to time, the question of malingering or simulation of medical illness arises. As indicated in the previous case and in the one to follow, experience has shown that because the diagnosis of malingering may lead to many unexpected complications it may be best to avoid considering any case as such, but to try to understand the reasons for its possible development.

We have already seen that failure to disclose a phobic reaction did not prevent a pilot from being successful. This was the case with the pilot who at the time of his cadet examination underwent a marked panic reaction to darkness. If he had disclosed this reaction to the examiner it might have prevented his being accepted for military flying. Despite this dissimulation he handled his anxiety successfully and received recognition as a good pilot. The following case reveals that the simulation of organic disease can be employed to avoid flying duties, especially because the differentiation between true organic disease and a functional disturbance is at times very difficult to establish fully.

Case 18. Epilepsy or malingering? A 29-year-old, voluntarily recalled pilot, who had flown as a co-pilot on routine C-47 flights in the United States for about one year, came to his flight surgeon for flying clearance several days after his arrival at his base in Japan, where he had been assigned to administrative duties which would include transporting air cargo to Korea. At that time there were many rumors that all pilots in administrative assignments were to be transferred to technical and combat flying. He surprised the flight surgeon with a strange request for phenobarbital and diphenylhydantoin sodium (dilantin sodium) because he was having "small black out spells" which had developed earlier in civilian life. He alleged that at that time he had

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been told it was epilepsy and he had taken medication for about one year. Because every military pilot should have been questioned adequately concerning the history of recent seizures, such seizures being definite disqualifications for military flying, this request seemed absurd. Upon further questioning, however, he indicated that he had been treated three years previously, and had then discontinued treatment because the seizures had disappeared. About a year prior to the present examination he had had the opportunity to join a National Guard unit which allowed him to return to flying status, flying T-6's. At the time of that examination he had said nothing about his previous spells because "he had not had any for over a year" and "he was not asked if he had anything like seizures or epilepsy." It was established, however, that if this man had properly filled out his required medical history, this history of seizures would have been uncovered and, if true, would subsequently have disqualified him for flying. Nonetheless, he came on active duty as a pilot, chiefly in motor pool administrative work. He usually flew only as a second or third co-pilot in C-47's to get his flying time. He rarely took any real responsibility for the manipulation of the plane. Except for his stated history, complete physical review failed to disclose any evidence of seizures. On one occasion he was rushed to the dispensary because he had "passed out," but upon examination, and from reports from observers, there was no evidence to corroborate the findings of a true seizure of any kind; nevertheless he was held grounded during investigation. Psychiatric review indicated that he had been a commissioned pilot in World War II, but had actually been flying in single-engine propellor driven aircraft for only one month when he was hospitalized because of vague bladder and urethral symptoms. After discharge from the hospital, which occurred at the close of World War II, he did not return to flying status and was discharged from the service shortly thereafter. During this interim period he claimed he had developed some "seizures." His adjustment in civilian life had been barely adequate. Despite the fact that he had actually flown only a very limited number of hours during World War II, he had been able to manipulate his return to military flying through personal contacts. Correspondence was initiated in an attempt to obtain the reports of his original physical examination upon recall, but these were not forthcoming. A review of his military efficiency, prior to coming overseas and while he was on duty at his present air base, indicated that he was really an inferior officer whose attitude and initiative were below average. Because he demonstrated no drive to improve himself and his actual ability in any capacity was questionable, he was not considered to be a suitable officer for prolonged military service. This and the history of a barely adequate adjustment in civilian life made it advisable to allow him to request separation from the service on the basis of his military category status. Because by both psychiatric and administrative criteria it was believed that he was actually a debit to the service, the pursuit of more drastic disciplinary measures in an attempt to prove malingering or simulation

of "seizures" was considered to be a waste of time. The ease with which he revealed the history of his "spells," thus ensuring his being grounded whenever a transfer to fighter or combat flying appeared imminent, demonstrated that his motivation for flying was minimal. This man's basic inadequacies and lack of true loyalty to himself or others indicated that the best solution was to separate him from the service and terminate his commissioned status.

Comment. It must be admitted that, from either a psychiatric or an administrative viewpoint, it is far more profitable to assist well-motivated flying personnel in resolving their emotional disturbances than it is to prove or disprove a history such as the one given above. A combined medical, psychiatric, and administrative investigation of all factors will keep well-motivated men from being lost to military flying, and will also remove inadequate, disloyal persons from important positions.

Such somatically disguised problems presented by the "fear of flying" syndrome are not new to the Korean conflict; during World War II they were found both overseas and in the United States.[6] At that time many men evacuated to general hospitals in the United States with emotional or physical disturbances identical with those described above clung so tenaciously to their psychosomatic or psychiatric difficulties that medically they were considered to be incapacitated. Many, even years after release from active duty, repeatedly met retiring boards or sought veterans' compensation for these bizarre complaints. That this occurred on such a scale was due to the then widespread error of tagging these men with psychosomatic or psychoneurotic labels, when their real problems revolved around basic emotional conflicts which could have been better handled in the manner described in this article. Early psychiatric treatment can now uncover the basic problems so that the patient can be treated and motivated to accept his duties and obligations.

TREATMENT TECHNICS

The Principle of Deterrence. In dealing with the "fear of flying" problem, the Air Force, from time to time in the past, has set up definite policies varying from harsh punitive measures to simple separation. Such marked variations in policy have been due to the interaction of conflicting interpretations of the problem with the very real necessity for maintaining the fighting strength of the Air Force. Due to the authoritarian nature of military life and discipline, it has always been true that some superiors have expected all subordinates to conform and to live up to their obligations regardless of fundamental problems and anxieties. Such a superior, already resistant to fulfilling many of his men's basic needs for dependency and security, may believe that a man can control himself through will power or can be

controlled by authoritative demands to "be normal." In the struggle, the mutual hostility of man and officer may increase to the point of impasse.

Nevertheless, in order to prevent other "suggestibles" from failing to conform, authority must set up, in accordance with the principle of deterrence, suitable rules, regulations, and forms of punishment to control the entire group, even though only a few may fail to conform.

The total approach. In the past, several avenues of approach have been used with varying degrees of success. One, the strictly administrative approach, often failed to consider the presence of hidden, underlying emotional factors which now are recognized as playing important and harmful roles. The second, purely medical approach suffers from the desire, conscious or unconscious, of many medical officers or flight surgeons to absolve the flier of blame which causes them to seek diligently for disabling physical disease when only vague somatic complaints are present. Thirdly, the purely psychiatric approach is hampered at times by those well meaning psychiatrists who are tempted to explain or condone a man's behavior on the basis of existing emotional conflicts. While each of these approaches has some merit, none is adequate in itself. Frequently the need for using one or another of these approaches will appear to be so obvious initially that the possibilities of the other two may be totally disregarded. If each individual "fear of flying" problem is to be clearly understood and properly handled, all three aspects of the problem—administrative, psychiatric, and medical—must be considered as parts of a whole. Only in this way can each "fear of flying" reaction be properly evaluated so that as many worthwhile fliers as possible will be returned to duty, and that inadequate men will be removed from responsible flying positions. Failure to consider all aspects has led to some unhappy situations, both for the Air Force and for the men concerned, as some of the cases herein have demonstrated.

The role of the medical officer in this total approach must be played actively, frankly, and decisively. Once given the initiative he must not fear the responsibility of making honest decisions, or be disturbed over possible consequences. He can best do this if he investigates, alone or with the help of others, the quantitative effect of the various factors involved.[5] The presence of a medical condition which will ground a flier also absolves him of any underlying lack of motivation or further responsibility toward his flying duties. If a definite physical disturbance or abnormality is present, medical grounding resolves the problem. No further action can be taken until it is established that the medical impairment either is permanently incapacitating for flying or is relieved so that the man may fly again.

Recommended Therapeutic Approaches. Treatment of each case must be individualized, taking into consideration the various medical, psychiatric, and administrative aspects, but focusing chiefly, according to the decision reached, on returning men to effective flying status or on removing those found to be unacceptable or inadequate.[7] Because the aim of this article has been to demonstrate the "fear of flying" syndrome and its symptoms, and to provide a practical approach to the problem, no attempt has been made to discuss at length such dynamic concepts as sexual symbolism in flying, oedipal relationships, or problems of ego development. It is believed that the suggestions below, if properly followed, will be of great value in maintaining flying effectiveness.

1. When a problem is clearly recognized as a "fear of flying" syndrome, it should be investigated, evaluated, and treated as near to the duty assignment as is logistically and medically possible. This approach approximates the same technic that the Army uses in handling its front-line combat psychiatric problems. For the farther back in medical or administrative echelons that these men are allowed to proceed, the more difficult it becomes for them to give up their deeply rooted syndromes. Difficult cases, of course, requiring specialized treatment, must be transferred sufficiently early for therapy to be successful.

2. To avoid the extremes of an overly sympathetic identification with the patient or a rigidly punitive attitude toward him, the medical officer should maintain an open-minded but critical position. If as a physician he approaches each man's difficulty with an honest and serious interest, his patients will understand that he is doing his best to help them resolve their problems.

3. During therapy the medical officer constantly offers his personal support and strength to help the flier work out his problems in reality, because strong ego support may help him shift displaced anxiety from the "fear of flying" back to its original source.

4. Because he may possess conscious or unconscious conflicts similar to his patient's, the medical officer avoids an over-identification to forestall the development of an excessive dependency through which the patient may attempt to control him. Often when a physician attempts to sever the bonds of such a relationship he finds that they are far stronger than he at first suspected. This consequence of over-identification was well illustrated in case 16. The physician's attitude, therefore, though it may be warm and friendly, must also be firmly objective, leaving the patient free to make his own decisions regarding his future course of action.

5. When a patient speaks openly of an uncontrollable "fear of flying," the medical officer must curb his annoyance at such prefatory remarks as "I have made up my mind, nothing can change it. I have this fear and I can't see where you can help me." Frequently the man has been instructed by command order or medical authorities to come for further evaluation, a procedure which he may believe is unnecessary. Regardless of the resistance which he may encounter, the medical officer encourages the patient to discuss his problems. If the patient displays open suspicion and resentment because of the belief that he has come to be forcibly returned to flying duty, the medical officer may say, "I am not necessarily trying to make you change your mind concerning flying, I am really trying to understand more clearly what may have affected you so strongly. Perhaps if we learn a little more about the total situation we can both understand it better." On the other hand, if the patient is asked directly, "What emotional problems have you?" more often than not such a question will meet with marked resistance because it implies that the patient may be mentally deranged, or weak and incapable of handling his own affairs. Frequently he may not know the real nature of his problem. But if the patient is encouraged to talk about himself, his flying, his daily activities, his family, and his general background and interests, the discussion will usually provide the physician with clues to the nature of the patient's conflicts and frustrations, and also help the patient gain insight into his own attitudes toward others and toward his reality situation. Although this emotional "uncovering" may take several sessions to complete, it should reveal enough about the patient and his problems to enable the physician to arrange significant factors in a meaningful relationship, thus making a satisfactory resolution of the patient's conflicts possible.

6. If physical complaints or disturbances are present, as has been evident in the cases described above, a complete medical investigation should be carried out at once and its findings should be considered final. Repeated, half-hearted histories and inconclusive physical examinations not only confuse the physician but make the patient feel that the physician himself is incapable of handling the problem, and that some serious physical disturbance which the physician cannot recognize is present. If any medical or psychiatric question remains unanswered, immediate consultation asking for specific information and medical opinions should be obtained to prevent the long delays and needless grounding which give the patient time to brood over his condition.

7. When the patient's physical complaints are not supported by physical findings or are far in excess of minimal physical findings, the medical officer should not jump to the conclusion that the man is malingering; neither should he accuse the patient

directly and brashly of having a "fear of flying." The physician should approach the problem from a total viewpoint and indicate tactfully that, because the patient does not present any physical disturbances which can warrant medical grounding, the possibility that basic conflicts may be responsible for his aberrations should be investigated. At this point the patient may react in a hostile manner or even undergo an intensification of physical symptomatology, as though to prove that he is really ill. The physician must not be alarmed by this, but must help the patient to work through his conflicts, thereby obviating the need for the somatic fixation. As physician and patient begin to understand the meaning of the basic problem, both will better learn how to arrive at a solution.

8. If, as in cases of an acute reaction in early combat, the patient is openly agitated and confused to the point where he loses control completely, strong reassurance, adequate sedation, and a brief period of complete rest may be important to a quick recovery of earlier acceptable defenses. In many instances the flight surgeon regularly helps many such patients. The simple technic of allowing the patient to ventilate his conflicts, associated with supportive reassurance, is markedly effective in suppressing or repressing unwholesome reactions.

9. When the effect of severe emotional distress is perceived either in an openly expressed "fear of flying" or by psychosomatic symptoms, or when the patient appears to be emotionally resistant to overt aid, more expert psychiatric assistance should be requested and employed.

10. Depending upon the severity of the case, psychotherapy can then be carried out on an outpatient or inpatient basis. At the beginning of treatment the average patient may be kept grounded medically; if he responds suitably he can be returned to flying, even though psychiatric treatment is continued. Even though mild anxiety or some psychosomatic complaints may persist, the patient can return to his reality obligations because he has attained an understanding of his fundamental difficulties through "corrective emotional experiences." This activity can be of tremendous help to him in resolving many of the conscious or unconscious tensions related to his earlier problems. That this can be done has been demonstrated in foregoing cases.

11. In every case the role of the superego or conscience should be closely studied by the physician and should weigh heavily in determining the extent of administrative action. An understanding of the role of the superego also gives the medical officer a prognostic measure of how well the patient will accept further flying duties. The more active the superego in precipitating psychiatric or medical incapacities, the more the physician should

strive to help the patient resolve his problems.[5] A well-structured superego can be used to motivate the patient to accept his military and flying obligations.

12. The medical officer should not fear that his responsibilities for treating the patient medically and for contributing to administrative decisions when indicated are contradictory. If this dual role implies to the patient that the medical officer is guided only by administrative direction and authoritative attitudes, the medical officer must make it apparent that *he is really interested in helping the patient arrive at the best solution for whatever problem he may have.*

Recommended Diagnoses and Disposition of Cases. Finally, when the medical officer has a clear understanding of the total problem based upon all of the factors involved, he should make his own decision as to what action he will take. He must not shirk his responsibilities or fear the consequences of his action. While he should not consider himself as infallible, his decisions, if sincere and honest, will regularly be well advised. These decisions will include:

1. When examination reveals no psychiatric or physical disease and no evidence of marked underlying conflicts, the patient is returned to full duty with the expectation that he will resume these duties and do well (cases 2, 3, 6).

2. When examination reveals no psychiatric or physical disease, but personal integrity, loyalty, and proper motivation for flying are absent, the patient is returned to duty to accept his flying obligations or to face administrative action (cases 9, 17, 18).

3. When examination reveals definite emotional distress the patient is given the benefit of psychotherapy, either superficially by the medical officer or flight surgeon himself, or, if the emotional distress is too complex, by trained psychiatrists oriented toward Air Force problems. Following treatment, most of these men can be expected to return to flying duties despite a residue of mild anxiety or mild psychosomatic disturbances which they can handle adequately. At this time the diagnosis will generally indicate that the somatization or psychiatric reaction is cured or improved and the patient is fit for flying duty, or it will be: "No psychiatric or physical disease found; fit for full military duty including flying" (cases 1, 4, 5, 7, 8, 11, 12, 14, 16).

4. When examination reveals that the psychiatric difficulties or psychosomatic symptoms are so deeply ingrained that treatment would require a long period of intensive psychotherapy, the medical officer should have no fear of medically grounding the patient in an attempt to help him make a better adjustment for his

future life. If he succeeds in resolving his anxieties, he may later be considered for flying duties; if he does not, he should be kept grounded (cases 10, 13, 15).

INCIDENCE IN FAR EAST

An analysis of the cases found among flying personnel of the Far East Air Forces reveals that in relation to the total number of flying personnel the incidence of men involved in such difficulties has actually been very low. Examples have occasionally been found among noncombat personnel, but more frequently among men in combat areas. Almost all have been reserve or National Guard recallees; however, a small group of recently commissioned flying officers were in the group. No regular Air Force flying officers reached administrative disposition because of "fear of flying" itself, but some regulars did show psychosomatic disturbances characteristic of this syndrome. One (case 15) had to be evacuated medically.

About half had World War II experience. Of this World War II group, slightly more than 50 percent had undergone combat flying experiences, but the cessation of Korean hostilities did not eliminate "fear of flying" problems. Within the first six weeks following the "cease fire" armistice, four flying personnel were referred for psychiatric review because of "fear of flying."

As far as rank was concerned, most cases were equally distributed between first lieutenants and captains, with a small number of second lieutenants and two majors. Most, therefore, had had excellent previous flying training and had shown their ability to carry on their assigned duties efficiently enough to receive promotions. The majority were in the Far East theater for two to three months before they were referred for complete psychiatric evaluation. Those few cases which developed immediately upon arrival in the Far East occurred in men possessing basic personality defects and inadequacies. Pilots outnumbered navigators, but navigators or radar observers represented a higher number in relation to the total number of flying personnel in their specific categories.

More cases occurred in men flying fighter-bombers or fighter-interceptor type aircraft. Other cases were equally distributed among those in administrative, transport, tactical reconnaissance, and strategic air defense flying. Only rarely was a fighter pilot involved, and then only for psychosomatic disturbances early in combat which shortly thereafter subsided. In very few instances was a previous aircraft accident or other harrowing experience found to be important in precipitating a "fear of flying" reaction.

All the men involved were between the ages of 22 and 36 years. In a small group, assignment to flying unfamiliar planes was a

verifiable factor. Most were married men with definite home responsibilities, although a small group of single men with no real responsibilities except toward themselves were involved. Of the entire group examined medically and psychiatrically prior to administrative action, over 90 percent returned to resume their former duties; the remainder chose to face probable administrative action for refusing to fly. Only three were grounded medically, and one of these was evacuated to the United States (case 15).

The highest incidence of cases occurred within the first year of the Korean conflict, and appeared to be due to a laxity of authority and of decisive policy which allowed many disinterested or unmotivated men to claim "fear of flying." At this time there was little real understanding of how the problem should have been handled. During the second year of Korean hostilities, however, the incidence dropped to about 50 percent of the first year. This appeared to be due to improved motivation and more accurate diagnosis of the "fear of flying." During the third year of Korean hostilities the incidence dropped to about one fifth of the first year. This decrease was partly due to improved motivation, but was also greatly influenced by the combined medical, psychiatric, and administrative approach, which helped to prevent the men from succumbing to their emotional conflicts. This decrease reveals that early recognition of the problem and its prompt and adequate treatment can help to keep the great majority of its potential victims flying. It also will facilitate the early separation of those who are of no real value to the Air Force or who would become severe problems later on if they were to remain unrecognized or untreated.

PREVENTIVE MEASURES

Future Role of Air Force Commanders and Medical Officers. What more can be done to prevent trained flying personnel, when faced with overwhelming anxiety, from retreating into the "fear of flying" syndrome? Perhaps a clue may be found in the many men who, despite similar problems and frustrations, function successfully in their flying duties, not just because their personalities are more integrated or their personal defenses are more acceptable, but because the mutual regard and acceptance derived from their group relationships gives them a sense of "oneness" and belonging which further stimulates them to participate fully in all Air Force activities.

To encourage men suffering from a "fear of flying" to become part of the group, both medical and air officers must maintain an open-minded attitude which will help to bring the patient into empathy with the group and help him feel less separated and "cast out." To accomplish this the Air Force must train its leaders to support their men with tolerance and understanding.

It must also train its flying personnel to face conflicts, frustrations, and separations from families and civilian careers frankly and with equanimity.

The Air Force must help its flying personnel develop greater confidence in themselves, their superiors, and their airplanes. If the Air Force would recognize that frustrations, resentments, and various other problems will arise despite all efforts to avoid them, it can help each man so affected to deal with his difficulties with more understanding, thus giving him a greater chance of overcoming them and of making a better adjustment to reality. Also, the knowledge that his human needs are being considered with sympathy and understanding even though they may not be gratified will give him a sense of belonging. All this creates a high motivation and an "esprit de corps" vital to the successful functioning of the group.

In his therapeutic position as a physician and advisor, the medical officer, flight surgeon, or psychiatrist must understand that his role in combating the "fear of flying" consists of helping these men to adapt to their total life situation and to prevent their succumbing to unwarranted failures. If he condones or accepts somatic subterfuge, whether conscious or unconscious, and allows it to become fixed, it may incapacitate a normal man and prevent his adaptation in later life, developments which, as we regretfully know from our experiences in World War II, might be avoided.

In this connection it is well to remember the point made by Petersen and Chambers,[8] who, in discussing the perpetuation of war neuroses in Army personnel, stated that "Two things are of extreme importance—gain and guilt. The primary gain of removal from danger may be later complicated by financial gain in the way of pecuniary compensation. Such gains may be resolved. However, the burden of guilt that a soldier assumes once evacuated from combat for less than the very best of reasons is an intolerable thing, which the patient may well carry with him the rest of his life to his considerable detriment. We have all had plenty of sad and disheartening experiences in the treatment of NP casualties of the last two wars who were the victims of ill-advised evacuation. It may seem unkind to require further duty of a person who appears anxious and uncomfortable, but the greatest psychiatric mishandling, and the greatest possible unkindness, is the medical evacuation of a patient who has not yet performed with the degree of honor required of him by both his superego and the community as he sees it, aiding him to burn his bridges behind him and making his guilt irrevocable."[8]

I believe that the same is true of those Air Force men whose real difficulties are masked behind the "fear of flying" syndrome.

If we sing in harmony with the patient, fix his secondary gain, and perpetuate his conscious or unconscious feelings of guilt over his failure to continue flying, we can be sure that we are not helping him toward a better adjustment to reality. A sincere effort on the part of all Air Force officers to better understand what the "fear of flying" syndrome means in each patient will undoubtedly keep most flying personnel from succumbing to those emotional conflicts that can otherwise be successfully resolved.

SUMMARY

Based upon clinical experiences with "fear of flying" problems arising among flying personnel of the Far East Air Forces, an attempt has been made to clarify the nature of the "fear of flying" syndrome and to provide an understandable and workable solution for this problem by means of a combined medical, psychiatric, and administrative approach. The "fear of flying" syndrome has been defined as a complex reaction manifested by various behavior disturbances or psychosomatic reactions, and occurring among flying personnel as a result of anxiety generated from multiple external and internal conflicts, frustrations, and dangers. As such it differs from the expression of the basic, possibly universal fear of being maimed, mutilated, or killed by falling through space and hitting the ground with great force. This basic fear of injury or death, inherent in flying, serves only as the focal point for the accumulation of anxiety which has been generated by comparatively unrelated emotional conflicts, thus producing a "fear of flying" syndrome. The manner in which this syndrome develops in relation to the most significant conflicts capable of producing it has been traced, and specific case histories have been cited to illustrate the various components of the problem. Principles of treatment have been outlined and their use demonstrated in actual cases to indicate what technics will provide the best solution in each instance. The role of the superego as a prognostic and therapeutic agent has been emphasized, with special reference to cases showing psychosomatic expressions of this syndrome.

The thesis has been advanced that, if the Air Force is to prevent such emotional reactions as the "fear of flying" syndrome from impairing the efficiency of its flying personnel, it must go beyond the mere provision of a "physical armor" which, in spite of all the advances of aeronautical and aviation research which it represents, cannot provide the ideal conditions for "full faculty performance" in the absence of a stable psychic armor. The Air Force must realize that pilots are human beings and do something constructive about their human needs. Through tolerance and understanding, the Air Force can assist these men to face their conflicts and frustrations by instilling in them a feeling of belonging and a sense of the importance of their roles, however

great or small, in the successful accomplishment of the Air Force mission. This can be done only if the Air Force will take definite steps to increase the satisfactions that can be derived from membership in an outstanding Air Force. Because the airplane is merely an extension of man's hands, feet, body, and senses, its value as a military tool depends upon the skills of the men operating it.

Finally, it has been demonstrated that, through early understanding and proper treatment of emotional conflicts, preventive aviation psychiatry can play an important role in maintaining flying personnel at a high level of effectiveness, or in restoring impaired persons to their previous effectiveness. This article has definitely indicated that further intensive study of important basic emotional factors is of the highest importance if the nation's need for a powerful and competent Air Force is to be served.

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THE HUMAN FACTOR IN AIR COMBAT

For the Air Force pilot, air-to-air combat in the jet age is still a personal dogfight. Once the convulsive air battle has been joined, no electronic guiding device yet developed can substitute for a pair of sharp eyes, skilled senses, and an alert human mind capable of translating into stick and rudder action the "decisions" that produce a kill. Sober analysis of air warfare and homage to technological progress sometimes lose sight of this man. He is yet the physical, mental, and emotional mechanism that can transcend the insensate limitations of highly developed technology to permit selective reaction, subtle interpretation, and command decision. The greatest technical accomplishments have merely supplemented his skill, ingenuity, and adaptability. Without him they are as meaningless as any other tools without a craftsman.

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INFECTIOUS MONONUCLEOSIS

A Review of the Literature

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INFECTIOUS mononucleosis is characteristically described as a benign disease of unknown etiology, possibly caused by a virus, and beginning with chills, fever, sore throat, generalized myalgia, and malaise. The most significant physical findings usually are lymphadenopathy and a palpable spleen. With these signs and symptoms, the diagnosis can be confirmed by obtaining a blood smear showing a relative lymphocytosis with many "atypical" forms and blood serum with a significantly positive heterophil antibody reaction. The disease is commonly self-limiting and terminates in complete recovery except in a small percentage of patients in whom fatigue and an abnormal blood smear may persist for weeks or months.

Within the past decade, an increasing number of patients with infectious mononucleosis with a variety of unusual manifestations has been reported, so that it appears now to be a disease of protean manifestations second to none. Jaundice has been reported often enough in infectious mononucleosis to warrant serum determinations for the heterophil antibody in almost every case of infectious hepatitis. Contratto,[1] and Read and Helwig[2] reported jaundice in 5.1 and 3.7 percent respectively in their series of cases. Originally, jaundice was ascribed to enlargement of lymph glands in close proximity to the bile ducts, but more recently it has been demonstrated that hepatic impairment occurs in infectious mononucleosis[3] which in rare cases may even lead to cirrhosis of the liver.[4] To illustrate the bizarre way in which this disease may appear, Read and Helwig divided the signs and symptoms in four main groups: (1) respiratory, with nasopharyngitis, cough, epistaxis, and tonsillitis; (2) gastrointestinal, with nausea, vomiting, and abdominal signs; (3) anemias, including hypoplastic and hemolytic anemias, and thrombocytopenia; and (4) dermatological, with rashes, pruritus, and jaundice. It is apparent then that infectious mononucleosis may simulate an acute surgical condition in the abdomen or a variety of skin rashes, and be confused with typhus fever, measles, scarlet fever, typhoid fever, or secondary syphilis.[5] Confusion with syphilis may be a particular problem if a false positive serologic reaction for this disease is present.[6]

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MULTIPLE SYSTEM INVOLVEMENT

Encephalitis with dysphasia and mental confusion, or meningitis with a lymphocytic response in the spinal fluid may be encountered in infectious mononucleosis as well as other unusual central nervous system manifestations including cranial nerve palsies.[7-9] Bernstein and Wolff[9] in reviewing a large series of cases tabulated the following neurologic abnormalities associated with infectious mononucleosis: serous meningitis (spinal fluid normal with physical signs of meningeal irritation), four cases; meningitis (pleocytosis with increased protein and pressure in the spinal fluid), 13 cases; meningoencephalitis, five cases; peripheral neuropathy, five cases; encephalitis, five cases; and Guillain-Barré syndrome, seven cases.

Lesions of infectious mononucleosis may also produce benign interstitial nephritis with albuminuria, a virus-like pneumonia, or myocardial involvement.[11] The latter may be manifested by transient electrocardiographic changes consisting of lowering and inversion of the T waves in standard and unipolar leads, or prolongation of the PR interval.[12,13] In the lungs obstruction of the alveolar capillaries with alveolar distention plus perivascular and interstitial mononuclear infiltration have been observed.[2] Schultz and Hall[13] recently reported three patients in whom the blood serum showed a significantly positive heterophil reaction and absent cold agglutinins and the roentgenograms showed unquestionable evidence of pulmonary involvement.

Infectious mononucleosis should always be considered in the differential diagnosis of "fever of unknown origin." In this respect, Rubenstein and Shaw[14] stressed the importance of differentiating infectious mononucleosis from brucellosis. Both diseases manifest similar signs and symptoms, and may be characterized by an acute, subacute, or chronic course. I recall one case involving a young man admitted to the hospital with fever and malaise. The physical findings were normal and he had no other complaints throughout hospitalization. A remittant fever of 101° to 103° F. was present for two weeks. On about the twelfth hospital day his serum heterophil antibody and peripheral blood studies, which previously were normal, were significantly positive for infectious mononucleosis.

Thrombocytopenic purpura[2,15-19] is another rare entity described in this disease and may cause some confusion with the other blood dyscrasias. Read and Helwig illustrated a drop in circulating platelets from above 300,000 to below 100,000 per cubic millimeter in association with the occurrence of petechiae on the body in three patients with infectious mononucleosis during the early course of the disease. Other observers, doing serial blood studies, noticed transient reductions of platelets and red blood cells during the initial stages of this disease without any

other clinical manifestations of blood disorder. Spontaneous rupture of the spleen is an infrequent but usually fatal complication reported in patients with infectious mononucleosis.[20] These reports, plus studies at necropsy[21,22] which reveal pathologic changes in every organ of the body, make it easy to understand the variety of signs and symptoms that occur in infectious mononucleosis.

ACUTE HEMOLYTIC ANEMIA

Acute hemolytic anemia has been a serious complication recently described in patients with infectious mononucleosis. This finding is of particular significance because of the frequency of associating anemia and lymphocytosis with the diagnosis of leukemia. A review of the literature uncovered 10 patients who developed acute hemolytic anemia in association with infectious mononucleosis. Dameshek[23] reported a case in which the patient had received sulfadiazine. Spherocytosis, increased osmotic erythrocyte fragility, and elevated urinary urobilinogen were noted along with the presence of autohemagglutinins active at from 40° to 72° F. The administration of sulfadiazine may produce some doubt concerning the exact cause of hemolysis in this patient. In a report by Feldman and Yarvis,[24] microspherocytosis, increased erythrocyte fragility, and autoagglutination of red blood cells were similarly noted. Lymphatic leukemia with purpuric manifestations and bleeding gums was also present in this case but there was an improvement in the anemia and the heterophil antibody reaction reverted to normal after the acute febrile symptoms subsided. Riva[25] described acquired hemolytic jaundice in infectious mononucleosis due to autoagglutination of red blood cells. Both autohemagglutinins and hemolysins were responsible for the acute hemolytic episode in a patient presented by Ellis and associates.[26] Also in this latter patient the Donath-Landsteiner test was positive without other evidence of syphilis. Appelman and Morrison[27] reported acute hemolytic anemia in patients with this disease with a 25 percent spherocytosis and increased erythrocyte fragility to hypertonic saline. In another case reported by Wilson and others[28] no cause for the patient's acute hemolytic anemia was found but these authors suggested hypersplenism. Sawitsky and co-workers[29] described a patient with an unusual case of infectious mononucleosis with generalized lymphadenopathy, hepatosplenomegaly, jaundice, and acquired acute hemolytic anemia. A four-plus positive Coombs test was obtained. The Coombs test became negative as the anemia disappeared and the patient recovered. Carrol and Hadley[30] described a patient with acute hemolytic anemia with 1,750,000 red blood cells, 23 percent reticulocytes, and a serum heterophil titer of 1:896 (before and after absorption with guinea pig kidney). In 1951 I[31] reported a case in which the patient de-

veloped an acute hemolytic crisis seven days after the onset of illness. The red blood cell count was 1,670,000. An initial white blood cell count of 24,000 with 76 percent neutrophils changed on the sixteenth day to 10,500 with 51 percent lymphocytes of which 46 percent were of the atypical form. More recently Huntington[33] reported hemolytic anemia in an eight-year-old boy in whom the serum heterophil antibody reaction and the Coombs test were both positive. He was treated with adrenocorticotrophic hormone (ACTH) and made a successful recovery.

THE HETEROPHIL ANTIBODY

In none of the preceding 10 patients in whom acute hemolytic anemia was reported, was there a history suggesting past hemolytic episodes. The establishment of a diagnosis of infectious mononucleosis was believed to be relatively certain and was based upon a significantly positive Paul-Bunnell serum heterophil antibody reaction and a blood smear showing a classical marked relative lymphocytosis with a larger number of atypical lymphocytes[33] characteristic of the disease. Contratto stated that a positive heterophil reaction and a typical blood smear are so essential for the diagnosis that it cannot be made without them. A blood smear showing lymphocytosis with so-called atypical lymphocytes, although characteristic of infectious mononucleosis, is not as specific as the heterophil antibody reaction. Similar blood findings may occur in other diseases such as infectious hepatitis and infectious lymphocytosis. The heterophil antibody reaction is considered significant in a titer over 1:64. The height of the titer bears no relationship to the severity of the disease according to Cecil.[34] Kaufman [35] and Janeway and Dammin[36] reported false positive reactions in persons who had injections of horse serum in the recent past or had serum sickness. Kaufman also indicated that previous liver injections may cause a false positive reaction. Isolated cases of Hodgkin's disease and rubella[35] have been reported in the literature in which the patients have shown a positive heterophil reaction, but no definite explanation has been offered. Lymphocytic leukemia has also been described as being associated with a positive heterophil reaction but, in contrast, Feldman and Yarvis reported a patient with lymphocytic leukemia in whom the positive heterophil reaction became negative as the leukemia progressed. They attributed this to the concomitant presence of infectious mononucleosis. Kent[37] also described a case of unclassified leukemia in a 14-year-old boy which resulted in death. The heterophil antibody was very strongly positive. Kent, however, expressed the belief that the simultaneous presence of infectious mononucleosis could not be ruled out. Schultz[38] studied the heterophil agglutinin titer in a total of 57 patients suffering from Hodgkin's disease, sarcoma, blood dyscrasia, or tuberculosis. Diagnostic titers were

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obtained in a significant number of these patients with no past or present evidence of infectious mononucleosis. Should such false positive heterophil titers be suspected, lymph node biopsy and bone marrow studies would be of valuable assistance in a differential diagnosis.

Davidsohn[39] presented an excellent evaluation of the heterophil agglutinin. He explained that normal persons and persons with serum sickness have heterophil antigens in their sera known as Forssman's antigen which will agglutinate sheep erythrocytes. The titer in normal persons is usually not higher than 1:32, but in serum sickness and in persons recently injected with horse serum, the titer may rise to 1:64 or higher. With the use of guinea pig kidney, Davidsohn could obtain 100 percent absorption of Forssman's antigen; however, in the presence of infectious mononucleosis, absorption with guinea pig kidney did not significantly alter the heterophilic antigen titer. Davidsohn thus established that the heterophilic antigen in persons with infectious mononucleosis is unlike that in normal persons and in persons with serum sickness, and that the test can be made more specific for the disease by absorption with guinea pig kidney. No other animal tissue in Davidsohn's study could produce 100 percent absorption of the so-called Forssman's antigen. A confirmatory test may be used by absorbing the patient's serum with boiled beef erythrocytes before the former is used to agglutinate red blood cells of sheep. Beef erythrocytes will absorb the heterophilic antigen due specifically to infectious mononucleosis.

Attempts have been made to detect heterophil antibodies in the spinal fluid of patients with significantly high serum titers, but success has not always been attained.[9, 10, 40] The small amount of globulin present in the cerebrospinal fluid may be of importance in the lack of relationship between heterophil antibodies in the serum and cerebrospinal fluid.[10] Nevertheless, Silberstein and others[41] used a modified centrifuge technic to demonstrate the heterophil antibody in the cerebrospinal fluid of six patients with infectious mononucleosis. Heterophil antibody titers were recorded before and after absorption with guinea pig kidney and boiled beef erythrocytes. Only one of these six patients studied showed central nervous system involvement.

PHYSICAL SIGNS

In addition to pharyngitis, lymphadenopathy and splenomegaly have been two physical findings most commonly associated with infectious mononucleosis. However, Read and Helwig, presenting a series of 300 patients, reported 104 without palpable spleen and five without cervical or generalized lymphadenopathy. In Contratto's report of 196 patients, 17 percent did not have peripheral lymphadenopathy and 53 percent did not have a pal-

pable spleen. Stevens and associates[42] reviewed 210 cases of infectious mononucleosis and again emphasized that demonstrable lymphadenopathy need not always be present. Also in the latter report, only 43 percent of the patients had a palpable spleen. Philip,[43] Morris and co-workers,[44] and Berte[11] reported a total of four patients with infectious mononucleosis with active symptomatology—but without palpable spleens or lymphadenopathy. Three of these patients also had jaundice and demonstrable liver impairment. Etcheverry[45] described a type of infectious mononucleosis which he terms the "icteric type" without findings suggestive of the disease except jaundice, atypical lymphocytes, and a positive heterophil agglutinin titer.

BONE MARROW

Examination of the bone marrow in infectious mononucleosis has no specific diagnostic significance. Its main value is to rule out malignant lymphocytosis in patients with atypical disease. There are, however, certain characteristic changes that occur in the bone marrow in this disease. In 1945, Limarzi and others[46] presented a series of bone marrow studies done on 25 patients with proved infectious mononucleosis. They demonstrated that the marrow in this disease was that of myeloid hyperplasia and immaturity. The myeloid cells were increased in number with a marked degree of granulopoietic immaturity, never going as far as myeloblastic hyperplasia. Megakaryocytes were normal or slightly increased in number. The ratio of the myeloid to the erythroid series averaged 3.0:1.0. In the presence of normoblastic hyperplasia associated with anemia, this ratio was 1.1:1.0. Normoblastic hyperplasia is a characteristic response of the marrow to hemolytic anemia.[47, 48]

In a second report by Limarzi and associates[49] in 1946, a review of the literature uncovered more than 65 case reports of bone marrow studies done on patients with infectious mononucleosis, the majority of which conformed to the findings originally described by Limarzi and others[46] in 1945. In a few isolated cases authors described hypoplastic bone marrow, lymphocytic infiltration, or atypical lymphocytes in the bone marrow. In respect to the latter an attempt should be made to guard against dilution with peripheral blood during the performance of a bone marrow aspiration. Israëls,[50] however, made reference to his personal experience of finding "glandular fever cells," early plasma cell types, and plasma blasts in the bone marrow in infectious mononucleosis even when care is taken to minimize admixture with peripheral blood.

It is of some interest to note that in Freeman's[51] original discussion of the bone marrow in infectious mononucleosis, he suggested the possibility that this disease may really be a benign

and abortive type of acute lymphocytic leukemia. Limarzi and associates[46,49] have been the first group to make reference to this point and demonstrate that the bone marrow actually shows a lack of lymphocytic infiltration, and that the atypical lymphocytes do not have the metastatic or replacement qualities of lymphocytes in leukemia and malignant lymphomas. Saunders and Adams,[52] after administration of adrenal cortex extract and ACTH, studied the response of circulating lymphocytes in patients with infectious mononucleosis and in patients with chronic lymphatic leukemia. These hormones caused a drop in circulating lymphocytes in normal persons and in patients with infectious mononucleosis but not in patients with chronic lymphatic leukemia. These observations suggest further that there must be a basic difference between leukemia and infectious mononucleosis.

Povde and Sundberg,[53] using a different technic, studied the bone marrow of 23 patients with infectious mononucleosis and reported findings somewhat in contrast to the reports of Limarzi and associates.[46,49] In serial sections of aspirated marrow particles, granulomatous lesions were seen in those from nine patients, and aggregates of proliferating lymphocytes were described on bone marrow films from the majority of patients. Although the marrow was primarily hyperplastic, there was a decrease in the neutrophil series in all patients with a shift to the left in most cases. In addition, Hovde and Sundberg reviewed 108 cases in the literature and compared the similarity of bone marrow findings in infectious mononucleosis with those of brucellosis, sarcoidosis, and tuberculosis.

THE PERIPHERAL LEUKOCYTES

The variations in the peripheral blood in infectious mononucleosis may be considerable. Although one usually expects to find the total white blood cell count between 5,000 and 15,000 per cubic millimeter, it may vary between 3,000 and 48,000 and, in rare cases, may reach 63,000.[33,54] The differential count may show a polymorphonuclear leukocytosis early in the course of the disease which is eventually followed by a relative or absolute lymphocytosis.[33,54,55] The neutrophils may also show toxic granules with a shift to the left.[46]

It is easy to understand, with these variations in leukocyte counts, and manifestations, how infectious mononucleosis may easily be confused with pyogenic infections or blood dyscrasias.

TREATMENT

The treatment of infectious mononucleosis still remains symptomatic and supportive. Investigations with aureomycin hydrochloride therapy were encouraging in early reports. Subsequent reports have indicated that the newer antibiotics do not alter

the course of the disease. Schultz and Hall treated 36 patients with infectious mononucleosis with penicillin and 15 patients with aureomycin hydrochloride. They noted no reduction in overall duration of fever or symptoms as compared with a number of untreated control patients. Burnett and Milne[56] treated eight patients with aureomycin hydrochloride and eight without drugs. These authors also noticed no difference in either group.

CONCLUSIONS

Infectious mononucleosis characteristically presents signs and symptoms which easily lead to a correct diagnosis confirmed by typical hematologic and serologic findings. Unusual manifestations, however, occur often enough so that infectious mononucleosis should be kept in mind whenever one is confronted with any febrile illness in which the clinical findings present a diagnostic problem. Rare hematologic features including acute hemolytic anemias may be associated with this disease and cannot be differentiated from the primary blood dyscrasias without serologic and bone marrow studies.

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IMMUNIZATION TO TETANUS

Only one case of tetanus has been reported among U. S. Army personnel in Korea during the military operation in that area. This was a nonbattle type of injury occurring as a result of a bulldozer accident. It was a nonfatal case occurring in an individual who though having received adequate basic immunization was not given an emergency stimulating dose at the time of injury.

—ARTHUR P. LONG, Colonel, MC, USA
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RESPONSE OF ALLERGIC PERSONS TO ORAL ADMINISTRATION OF AN EPINEPHRINE PRECURSOR

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IN an attempt to control some of the acute and chronic manifestations of the allergic state, a new therapeutic approach has recently been offered by Widmann[1] and Widmann and Keye[2] in the form of epinephrine precursors. This report presents a review of the literature and a description of the therapeutic response of 56 persons with varying manifestations of allergy to such a precursor.

DEVELOPMENT OF A PRECURSOR

The ability of epinephrine to diminish or prevent many of the pharmacological effects of histamine, among them hyperpermeability and selective smooth muscle spasm, has long since made the drug one of the most valuable in the control of allergic disorders. The control of chronic allergic manifestations, however, remains a problem in spite of multiple therapeutic approaches.

Widmann and Keye,[2] observing certain well-known similarities in allergic persons as a group, pointed out that such traits as low to low-normal blood pressure, low to low-normal metabolism, asthenic body build, tendencies toward flat glucose tolerance curves, and general inability to adjust adequately to stress situations resemble, and might possibly represent, a chronic deficiency of the adrenal medulla. They postulated that the relationship between amino-acid metabolism and the adrenal medulla might be demonstrated by flooding the allergy-afflicted human organism with natural precursors of epinephrine, and they hoped that the organism could be altered beneficially by providing it with an increased reserve of available epinephrine when stress situations or antigen-antibody reactions occurred.

Based upon the cumulative work of many investigators, the known precursors of epinephrine were used in evaluating this concept. This combined research has resulted in the present opinion that tyrosine is one of the precursors of the epinephrine

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series[3-7] and that a phosphorylated derivative of pyridoxine acts as a necessary coenzyme in the conversion.[8-11] Highly suggestive though not conclusive evidence for this lies in tissue-slice experiments[12-14] and in studies on the intact animal, including the human.[15-18] In all instances in which tyrosine or a closely related precursor or derivative has been used, a pressor substance has been isolated which has epinephrinelike properties and which is able to raise the blood pressure of cats. This hypothesis has recently been confirmed by Udenfriend and associates,[19] who demonstrated that the feeding of tagged phenylalanine and tyrosine to rats resulted in the tracing of both substances to the adrenals and epinephrine. Based upon the work of Werle,[3] Blaschko,[4] and Holtz and Kroneberg,[5] one of the presently accepted pathways of tyrosine metabolism is represented below:

Tyrosine —(oxidation of ring in para position)→ Dihydroxyphenylalanine —(decarboxylation of side chain)→ Oxytyramine —(oxidation of side chain)→ Norepinephrine —(methylation of terminal group)→ Epinephrine

Tyrosine therefore was selected by Widmann and Keye as their starting point; pyridoxine hydrochloride was added to serve as the coenzyme of the tissue-decarboxylating enzyme, tyrosine decarboxylase, present in renal tissue,[4] and nicotinamide (niacinamide) was included because of its antihistamine properties.[20,21] These were combined to form a tablet containing 200 mg. of tyrosine, 2.5 mg. of pyridoxine hydrochloride, and 10 mg. of nicotinamide[2]—hereafter referred to as "tyrosine-nicotinamide-pyridoxine compound."

Widmann and Keye then administered the drug to themselves in progressively larger doses with no evidence of toxicity. As the compound was nothing more than a concentrated food product, no toxicity was expected. Since that time, and over a four-year period, about 2,000 patients have been treated by them with no evidence of toxicity.

DESCRIPTION OF TECHNIC

All patients in this series were dependents of military personnel stationed in Long Beach, Calif.; Oahu, Territory of Hawaii; or Guam, Mariana Islands. Ages ranged from five months to adulthood; the majority of patients were children. Most of the patients had received "allergic work-ups," and for the most part were poorly controlled with existing medications. A detailed history and physical examination was done, and laboratory tests indicated were carried out. All cases of vasomotor rhinitis were

examined by a competent otolaryngologist for confirmation of the diagnosis. The patients were studied over one and one-half years but, being dependents of military personnel, follow-up studies were often curtailed prematurely. Patients were not accepted into the series, however, unless in all probability they would be in the given area for at least six months. Placebos identical to the tyrosine-nicotinamide-pyridoxine compound were given to those patients deriving an "excellent" response, and were used for a two-week period without the knowledge of the parents.

Dosage varied as to the age group. Infants and children to two years of age were given from one to three tablets four times daily; children from two to six years of age received from two to eight tablets four times daily, essentially the same as the adult dose. The tablets were administered before meals and at bedtime. Table 1 indicates the type of allergy and result of treatment.

EFFECT ON ASTHMA

A total of 34 patients were treated, with 29 showing definite improvement. Of this group seven patients had no further asthma while taking the tyrosine-nicotinamide-pyridoxine compound. Whereas only one child under the age of seven failed to respond, there were four failures in children over seven. Improvement occurred in 88 percent of treated cases.

Two patients in status asthmaticus, refractory to epinephrine and aminophylline, were treated with the compound alone, being given eight tablets four times daily. Both were young men not included in this series. Subjective improvement occurred within an eight-hour period in both patients, and one, improving rapidly, became asymptomatic within two days. The other patient continued to be dyspneic and responded only to a combination of many medications.

CASE REPORTS

Case 1. Due to severe asthma, this six-year-old girl was flown to our clinic on 26 February 1952 from Norfolk, Va. Attacks of asthma had begun soon after birth, but these were occasional and the child had enjoyed normal growth and development in California. At the age of three, the child was taken to Norfolk where she immediately became worse, the attacks coinciding with upper respiratory infections. About six months of the past year had been spent in the hospital with severe asthma. Prior to her arrival in California, she was a hospital bed patient for 37 days. Upon reaching California some improvement occurred. No wheezing, decreased vomiting, and greatly increased well-being were noted. Physical examination revealed a pallorous,

TABLE I

Type of allergy	Treated	Improved*			Not improved
		Excellent	Moderate	Minimal	
Hay fever, seasonal	1	1			
Hay fever, perennial	15	4	4	1	6
Bronchial asthma, under age seven	21	7	13		1
Bronchial asthma, over age seven	13		9		4
Atopic eczema	4	2			2
Generalized urticaria	1	1			
Drug eruption	1	1			
Total	56	16	26	1	13

*Excellent – Arrested
Moderate – Definite symptomatic and objective improvement
Minimal – Equivocal objective improvement with patient or parent unwilling to discontinue medication because of subjective improvement

thin, sickly-looking child with some increase in the anteroposterior diameter of the thorax. The chest was clear, and the remainder of the examination was not remarkable. Laboratory tests showed the white blood cell count to be 8,100 with normal differential; hemoglobin, 12 gm.; red blood cell count, 4.14 million, and erythrocyte sedimentation rate, 11 mm./hr. The family history was strongly positive for allergy; her mother had hay fever and one sibling was asthmatic. Diabetes was present in all four grandparents. The patient was given a multivitamin preparation, and phenobarbital elixir. When next seen two weeks later, severe asthmatic attacks had occurred several times. On 25 March 1952 the child was placed on the tyrosine-nicotinamide-pyridoxine compound, two tablets four times a day. Within 48 hours, minor wheezing episodes occurred only rarely. Because of these episodes, however, the dosage was increased to 10 tablets daily in divided doses. All wheezing ceased, appetite returned, and the patient gained five and one-half pounds in six weeks. On 19 May 1952 the patient was placed on a placebo identical with the original medication. She immediately grew worse, and when seen on 2 June 1952 had again lost her appetite, wheezed constantly, and was most miserable. Prompt alleviation of symptoms occurred when the compound was again started. She continued to do well on this medication, felt better than at any time in three and one-half years, and was an active happy child.

EFFECT ON ALLERGIC RHINITIS

A total of 16 patients were treated with ten improved and six unimproved. A routine nasal smear for eosinophils was made prior to beginning treatment, and each patient was seen by the otolaryngologist to substantiate the diagnosis. The only patient with seasonal rhinitis treated began the tyrosine-nicotinamide-pyridoxine compound in the middle of the pollen season, became asymptomatic within two days, and remained so during and after 30 days of therapy. The dosage given was four tablets four times a day. The patient, included in the present series as showing minimal improvement, was treated for a period of one week without objective changes. She did not return to the clinic.

Of all patients treated, those with vasomotor rhinitis were most refractory. When the series was initiated, patients were given two tyrosine-nicotinamide-pyridoxine tablets four times a day with little or no improvement. They were then instructed to begin their course with two tablets four times a day, then increasing each dose by one tablet until symptomatic improvement occurred. Under this regimen some previous therapeutic failures responded satisfactorily. A rather striking objective change in the successfully treated patients was the transformation, over a two- to three-week period, of pale, edematous nasal

mucous membranes with enlarged turbinates to a normal salmon pink color with an actual diminution in size of the turbinates. In patients responding satisfactorily, accentuation of symptoms following two days of therapy was almost invariably present, and represented a favorable prognosis. The number of eosinophils seen on routine smears of nasal mucus was also a valuable prognosticator—the more eosinophils, the better the response. Therapeutic failures also were refractory to antihistaminics and to both specific and general desensitization procedures. Scratch tests on the failures invariably revealed multiple sensitivities.

Case 2. A seven and one-half-year-old girl, who had had a runny, stuffy nose since four years of age, entered the outpatient clinic because the Long Beach, Calif. climate had aggravated her condition. Scratch tests were highly positive only for dog-hair, wool, and house dust. Desensitization procedures had proved ineffective. The family history was not contributory. Physical examination disclosed obstruction of the nares by pale, edematous mucous membranes and enlarged inferior turbinates, completely blocking the nasal airways. The remainder of the physical examination was essentially negative. On 25 July 1952 the patient was placed on a regimen of three tablets of tyrosine-nicotinamide-pyridoxine compound four times a day. Nasal smear prior to treatment revealed two eosinophils per high power field. On 1 August 1952 she was completely asymptomatic for the first time in three years. Inferior turbinates had decreased in size, restoring a nasal airway. On 8 August, while on the same dosage of the compound, a rather violent exacerbation of previous symptoms occurred. Dosage was increased to four tablets four times a day, with prompt subsidence of symptoms. On 22 August, the date of the next appointment, she had remained asymptomatic and the medication had been decreased to three tablets four times a day. She has continued on the compound to the present time.

EFFECT ON ATOPIC ECZEMA

Of the four patients treated, two became rash-free; however both patients showing improvement had only mild cases of patchy eczema in antecubital fossae and on the face. Severe generalized eczema as seen in the two failures did not respond whatever, and due to the small number of patients no conclusion is warranted.

Case 3. This five-year-old girl was first seen on 4 June 1952 because of eczema since birth. As an infant she had had known sensitivities to egg, wheat, and milk. The skin had never been completely cleared. The family history disclosed that her mother had been similarly affected as a child, and her father had perennial rhinitis. Examination revealed a scaly, erythematous, rough-

ened skin over the cervical area adjacent to the posterior hair line, and similar areas were present in the popliteal and antecubital fossae. Histar ointment* had been used but without success. This was continued and the patient was given two tablets of the tyrosine-nicotinamide-pyridoxine compound four times a day. On 18 June 1952 the skin was no longer rough. Both antecubital and popliteal areas were slightly erythematous, but the skin was soft and smooth; the cervical area had cleared entirely. When the dosage was increased to three tablets four times a day, these erythematous areas cleared also. During the six-month follow-up, there was no recurrence.

EFFECT ON GENERALIZED URTICARIA

An 18-year-old youth who had suffered with daily giant urticaria for two months without discernible cause became rash-free on four tablets of the tyrosine-nicotinamide-pyridoxine compound four times a day. When the patient's symptoms promptly returned upon subsidence of therapy, he was hospitalized elsewhere for investigation, and contact with him was lost.

EFFECT ON DRUG ERUPTION

A healthy three-year-old boy was given elixir of phenobarbital while he was accompanying his family to a new duty station. When seen the child had a brawny, erythematous, slightly pruritic rash generalized in distribution. Due to the lack of associated signs and symptoms of systemic illness, it was attributed to phenobarbital. The child became rash-free within 24 hours after being given two tablets of the tyrosine-nicotinamide-pyridoxine compound.

DISCUSSION

The classical therapeutic approaches in the treatment of the allergic state have been (1) removal of the offending allergens, (2) hyposensitization against known specific allergens, and (3) nonspecific hyposensitization measures. Widmann and Keye offered an approach partially encompassing all three. If their concept, in part based on an adrenal medulla insufficiency, is valid, one should be able to find examples in the literature of faulty tyrosine metabolism in which a strong history of allergy is present. Such cases are lacking, but the rarity of the condition could conceivably be the reason. One of the characteristics of patients suffering from phenylpyruvic oligophrenia, however, in which the chemical defect is a failure to oxidize phenylalanine to tyrosine, is a patchy eczema, giving further support to the theory that allergy is related to amino-acid metabolism and the physiologic production of epinephrine.

*Combination of 2 percent antihistamine (pyrilamine maleate) with 5 percent coal tar extract in a hydrophilic base.

The beneficial effects of adrenocorticotrophic hormone and cortisone on allergy may be related to the effect of the tyrosine-nicotinamide-pyridoxine compound in that increased epinephrine production, with subsequent stimulation of the hypothalmus and anterior pituitary, could result in greater production of ACTH and cortisone. The results obtained in this study therefore, might be due to a minimal increase in ACTH and cortisone.

In about 2,000 patients treated with the above compound, Widmann and Keye observed beneficial results in vasomotor rhinitis, bronchial asthma, pruritic skin lesions, drug sensitization, histamine headache, and trifacial neuralgia. Functional hypoglycemias with associated hypotension likewise responded to medication. In one series of 492 patients, improvement occurred in 356 (72 percent).[2] The present series is extremely small, but the results, which show 77 percent of patients improved, are comparable to the larger series. I believe that any measure in the management of allergy responsible for such improvement warrants further investigation.

SUMMARY AND CONCLUSIONS

A recent concept of the origins of allergy, which holds that subclinical adrenal medulla insufficiency may be contributory to the allergic state, is reviewed. It is believed that the correction of such an insufficiency by the oral ingestion of the epinephrine precursor, tyrosine, is theoretically possible. The response of 56 patients with various manifestations of allergy to the amino-acid tyrosine showed an over-all improvement of 77 percent. Tyrosine-nicotinamide-pyridoxine compound is at least a useful adjunct in the therapy of allergy, and warrants further investigation.

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LOWERED TUBERCULOSIS RATE

The 50th anniversary of the National Tuberculosis Association this year marks a milestone in the organized campaign against the disease. At the beginning of the century tuberculosis was the leading cause of death in our country. It was then particularly rampant in the congested areas of our rapidly growing cities and took its heaviest toll among men in early adult life, creating widespread widowhood and orphanhood.

In the half century since the antituberculosis campaign was launched, extraordinary progress has been made in the control of the disease. The tuberculosis death rate in the United States dropped from 183.9 per 100,000 in 1900-1903 to 12.6 in 1953; the rate will probably fall to about 10 per 100,000 in 1954. Whereas the disease outranked every other cause of death at the turn of the century, it has since been reduced to tenth place; at the same time its toll has decreased from 11 percent to little more than one percent of all deaths.

From *Statistical Bulletin*,
p. 1, April 1954

PROTHROMBIN DETERMINATION AT 4° C.

Its Use as a Bedside Test

A. DAVID ETESS, *Lieutenant (MC) USNR*
LEON N. SUSSMAN, *Lieutenant Commander (MC) USNR*

IN the study of various phases of prothrombin determination, we have been impressed with the effect of temperature on prothrombin time.

Popular methods for the performance of this determination have been instituted by Quick,[1] Warner and associates,[2] and Shapiro and associates.[3] All of these methods, and the micromethod recently introduced by Isenberg,[4] are done in a constant-temperature water bath at 37° C. Kato's[5] microprothrombin test with capillary whole blood, and the method advanced by Goldfeder and associates[6] are done at room temperature. They performed 78 prothrombin determinations on Swiss mice, and reported means of 28.4 seconds at a room temperature of 23° C., 24.9 seconds at 26.5° C., and 22.9 seconds at 28.5° C. This supported the view that a reduction in the temperature at which prothrombin determinations are performed prolongs the prothrombin time.

We therefore chose to study the prothrombin determination in ice water. It was found that as long as ice was present in the water bath, a reliably accurate temperature between 2° C. and 4° C. could be maintained.

Using the Link-Shapiro modification[3,7] of the Quick one-stage method, 198 oxalated samples of whole plasma were subjected to prothrombin determination at 37° C. in a constant-temperature water bath. Duplicate determinations were made and the average obtained. The identical procedure was then repeated on the same specimen of whole plasma at 4° C. in an ice water bath. The specimens studied had been submitted to the chemistry laboratory for prothrombin determination, and included blood samples from patients receiving anticoagulants, predominantly bishydroxycoumarin (dicumarol). One hundred and fifty-two prothrombin times were likewise simultaneously obtained at 37° C. and 4° C. on whole blood. The materials used were M/10 solution of sodium oxalate, M/200 solution of calcium chloride, thrombin (thromboplastin), 0.85 percent sodium chloride solution, and barium sulfate, C. P.

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PROCEDURE

Four and one half milliliters of freshly drawn blood were added to 0.5 ml. of M/10 sodium oxalate solution. Clear plasma was obtained by centrifugation, and divided into two parts; 0.1 ml. of whole plasma at 37° C., taken from the first part, was added to

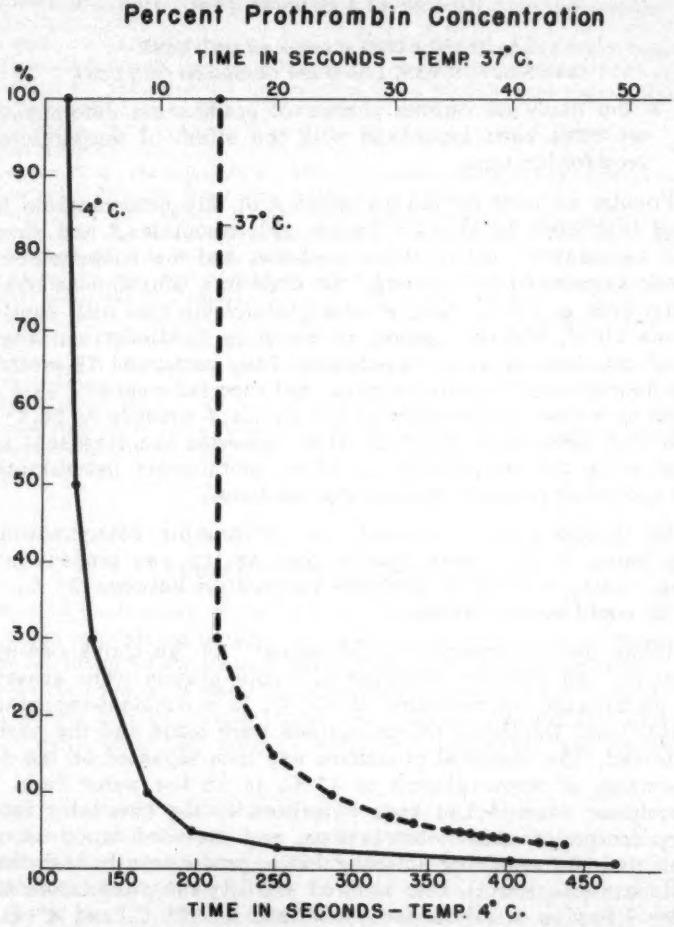

Figure 1. Comparison of percent prothrombin concentration curves at 37° C. and 4° C.

0.2 ml. of thrombin-calcium chloride mixture (also at 37° C.), and the time of clot formation was noted on a stop watch. Then, 0.1 ml. of whole plasma at 4° C., from the second part, was likewise

added to 0.2 ml. of the thrombin-calcium chloride mixture (at 4° C.), and the time of clot formation noted.

RESULTS

Employing barium sulfate prothrombin-free plasma as a diluent, plasma prothrombin concentration curves were obtained at 37° C. and 4° C. (fig. 1). These indicated that the relationship of prothrombin concentration to prothrombin time remained unchanged regardless of whether the determination is performed at 37° C. or 4° C.

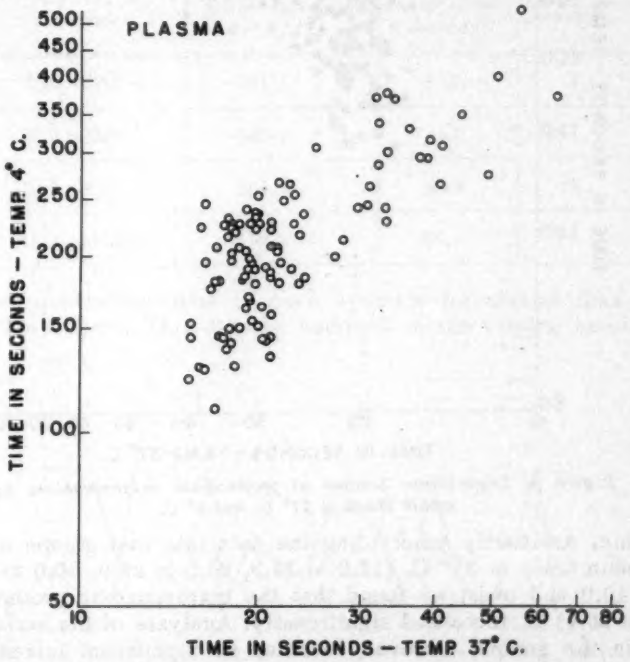

Figure 2. Logarithmic scatter of prothrombin determinations on whole plasma at 37° C. and 4° C.

The remainder of the results are represented graphically in figures 2 and 3. These scatter diagrams were obtained by plotting logarithmically along the abscissa the prothrombin times on the same specimen of whole plasma (fig. 2) and whole blood (fig. 3) at 37° C., and along the ordinate the prothrombin times at 4° C. for plasma and whole blood. Examination of these diagrams reveals that a constant relationship exists between prothrombin determinations at 4° C. and 37° C. This relationship is stronger for plasma than it is for whole blood.

In order to corroborate further the conclusion that the variables are related, the data on the whole plasma was subjected to statistical analysis by application of the analysis of variance

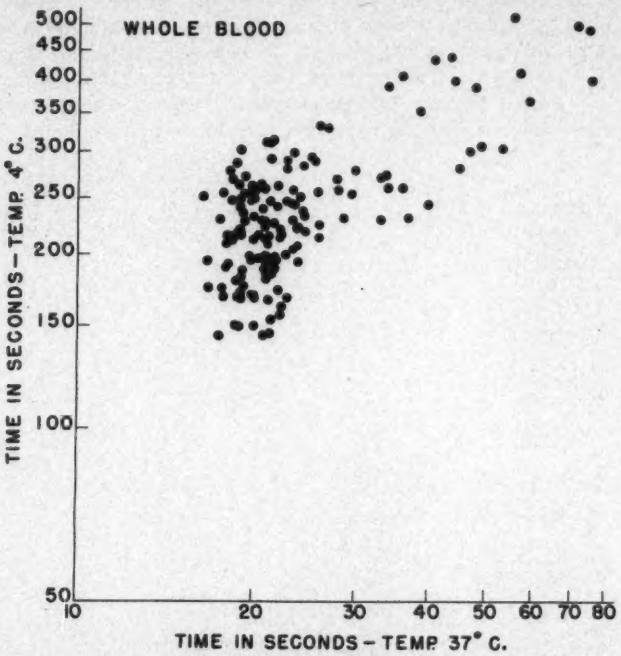

Figure 3. Logarithmic scatter of prothrombin determinations on whole blood at 37° C. and 4° C.

technic. Arbitrarily subdividing the data into four groups of prothrombin times at 37° C. (15.0 to 19.9, 20.0 to 29.9, 30.0 to 39.9, and 40.0 and over) we found that the corresponding prothrombin times at 4° C. increased significantly. Analysis of the variations within the groups, however, revealed no significant increase in magnitude (table 1).

DISCUSSION

Whether the conversion of prothrombin to thrombin is a stoichiometric or enzymatic reaction, reduction in temperature at which the reaction occurs prolongs the time of clot formation.

The advantage of performing the prothrombin time at 4° C. rather than in the conventional manner lies in the relative slowness of the clotting reaction at this temperature. This enables one less skilled to determine the end point with greater efficiency and accuracy, because the reaction occurs over a period of minutes

rather than seconds. The simplicity of materials and equipment permits the bedside determination of prothrombin time at 4° C. For convenience, the blood is oxalated and the prothrombin determination performed on the plasma, but it has been demonstrated that the prothrombin time can be applied to whole blood,[8] thereby obviating the need for a centrifuge.

TABLE 1.

Prothrombin times at 37° C. in seconds	Arithmetic mean for corresponding prothrombin time at 4° C.	Standard deviation at 4° C. in seconds	Number of cases
15.0 - 19.9	191.3	36.3	94
20.0 - 29.9	207.5	44.1	31
30.0 - 39.9	303.5	46.5	15
40.0 and over	358.3	84.6	7

The prothrombin time is more accurate for plasma than it is for whole blood. This may be ascribed to the varying hematocrit

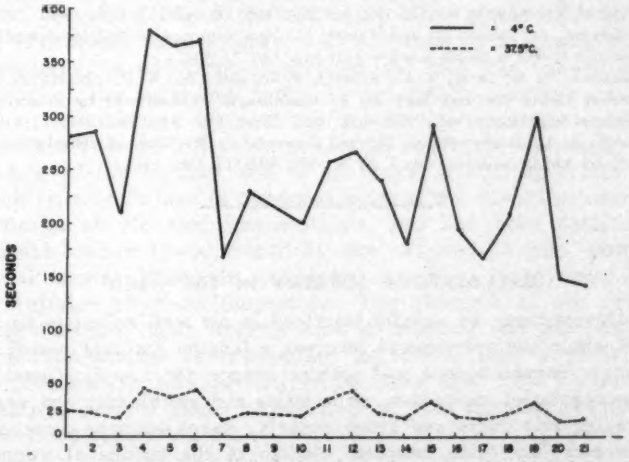

Figure 4. Prothrombin times at 37.5° C. and 4° C. in a patient receiving bisbydroxycoumarin.

values of whole blood samples; hence low hematocrit values would indicate greater plasma volumes per aliquot of whole blood. Patients receiving bishydroxycoumarin can be followed by pro-

thrombin times at 4° C. with equal accuracy. One such case is illustrated in figure 4.

The relationship of prothrombin time at 37° C. and 4° C. for dilute (12.5 percent) determinations is at present under study. The trend seems to indicate that the relationship remains constant at this dilution.

SUMMARY

A reduction in the temperature at which the test to determine the prothrombin time is performed prolongs the time of clot formation. The simplicity of materials and equipment required for determination of prothrombin at 4° C. permits its use at the bedside.

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GALLBLADDER SURGERY IN THE AGED

Cholecystectomy as usually practiced is not well suited to an aged patient since scalpel removal involves a lengthy drainage period with its longer convalescence and greater chance for complications. The electrocoagulation procedure, obliterating the gallbladder and sealing all leaking bile ducts and blood vessels, makes drainage unnecessary and permits immediate complete closure of the abdominal wound. It is rapidly done, minimizing shock and lowering the chance of infection, and is thus especially well suited to an aged patient.

—MAX THOREK, M. D.
in *Geriatrics*,
p. 61, Feb. 1954

DETERIORATION DURING STORAGE OF ALGINATE HYDROCOLLOIDAL DENTAL IMPRESSION MATERIAL

KENNETH R. PFEIFFER, *D. D. S.*
JAMES L. HARVEY, *B. S.*
GERHARD M. BRAUER, *Ph. D.*

THE hydrocolloid, alginate type, 12s:dental impression materials* were introduced during World War II as a substitute for the then scarce agar-agars. They have gained increasing favor because of their ease of handling and accuracy of reproduction.

The physical properties and clinical behavior of these materials have been studied by Skinner and Pomes,[1,2] Cresson,[3] Worner,[4] and Schoonover and Dickson.[5] One of the serious difficulties encountered in their use has been their tendency to deteriorate during storage. Two distinct types of aging failure have been observed. In some cases the material, after storage for a short time at ordinary temperatures, will not form an insoluble elastic gel. Schoonover and Dickson showed that this was caused by the removal of the retarding agent by premature reaction with the compounds added to convert the soluble gel into the insoluble form. This type of difficulty is readily overcome by proper compounding of the mixture and is no longer a serious factor. The second type of failure is observed most often when the materials are stored at elevated temperatures, and has been particularly noticeable when these materials are shipped to and stored in tropical areas. Materials subjected to these conditions often have inferior physical properties. The strength of the gels is greatly reduced, their setting time is altered, and the accuracy of the reproduction is inadequate for dental use. Experimental data obtained in this investigation show that this type of deterioration results from degradation of the alginate polymer at elevated temperatures.

EFFECT OF TEMPERATURE ON DETERIORATION

Samples of five commercial brands of alginate impression materials commonly supplied military dental clinics were bought

From Dental Research Laboratory, National Bureau of Standards, Washington, D. C. Dr. Pfeiffer is now at Veterans Administration Hospital, Durham, N. C.

*Stock No. 5-362-500, Armed Services Catalog of Medical Materiel.

on the open market before 1951 and were stored in the packages as received, at 21° C. and 60 percent relative humidity, and at 37° C., 50° C., and 65° C. at relative humidities of less than 60 percent. At the end of one month, samples of each material were removed and their setting time, permanent deformation, compressive strength, ease of manipulation, and gel-forming characteristics were determined. The measurement of these properties provides a satisfactory means of following the extent of degradation; the compression test appears to be the most useful. This procedure was repeated on other samples stored at 50° C. for three and one half months. The method described in American Dental Association Specification Number 11 for hydrocolloidal impression materials[4] was used to determine setting time. The permanent deformation was determined by the method described by Cresson. The compressive strength was determined on cylindrical specimens about 0.5 inch in diameter and 0.75 inch in height loaded at a head speed of 0.20 inch per minute on the testing machine until rupture occurred. These specimens prior to crushing were stored for one hour at 21° ± 1° C. under conditions approximating 100 percent relative humidity. The gel-forming properties and ease of manipulation were determined by making mixes of the material and observing the general characteristics of the mix.

The data obtained are given in tables 1 and 2. It will be observed from these data that only small changes, if any, occurred in any of the materials stored at 37° C. for one month when compared with those stored at 21° C. After one month's storage at 50° C., a marked reduction in the compressive strengths was observed. The deterioration was more pronounced after storage for three and one half months at 50° C. and resulted in a loss of strength of from 25 to 45 percent. Storage at 65° C. produced such rapid deterioration that most of the products failed to set after one month's storage at this temperature and were unsuitable for use as impression materials.

In order to determine the effect of extended storage under temperature conditions likely to be encountered for the materials, another series of specimens was stored for 30 months in an unheated storage room (temperature range about 5° to 50° C.). Properties of two compounds changed little (table 2), and these materials were considered satisfactory for general use after storage under these conditions. A third impression compound did not set after storage under the same conditions. This material did not change appreciably on storage at 21° C. for the same length of time.

The failure to set and the resulting loss in strength do not appear to be caused by oxidation of the organic alginate, because

TABLE 1. *Effects of storage temperature on properties of hydrocolloid, alginate type, 12s:impression materials*

Material	Setting time (minutes)					Permanent deformation after 12 percent strain* (percent)					Compressive strength one hour after mix** (lb. per sq. in.)					Reduction in strength after 3 1/2 months at 50° C. (percent)
	Storage															
	1 month				3 1/2 months	1 month				3 1/2 months	1 month				3 1/2 months	
	21° C.	37° C.	50° C.	65° C.	50° C.	21° C.	37° C.	50° C.	65° C.	50° C.	21° C.	37° C.	50° C.	65° C.	50° C.	
CoeLoid	5	5	5	fs***	7	1.8	1.7	2.0	—	2.1	45	43	34	—	27	40
DeP elastic impression cream	5	5	5	8	5	2.3	2.3	2.3	3.8	2.1	151	134	130	12	114	25
Kalginate	5	5	5	fs	6.5	3.0	3.4	3.7	—	4.1	76	69	56	—	42	45
Moyco	4	4	4.5	fs	6	2.1	2.2	2.7	—	2.2	26	26	19	—	16	38
Zelex	4.5	4	4	fs	3	1.5	1.3	1.6	—	1.9	50	48	46	—	35	30

*Maximum standard deviation = 0.09; maximum coefficient of variation = 6.6 percent.
**Maximum standard deviation = 0.9; maximum coefficient of variation = 4.7 percent.
***fs = failed to set.
NOTE: Specimens of CoeLoid, Kalginate, and Moyco changed color when stored at 65° C. (149° F.).

impression materials, stored under nitrogen and heated, deteriorated in a similar manner and at about the same rate as the materials exposed to air during heating. The possibility of microbiologic action was rejected owing to the highly alkaline nature of some ingredients of the impression compounds and to the fact that no microscopic evidence of such action was apparent in the deteriorated powders. The inorganic salts and fillers used in compounding these materials are usually heat stable at the temperatures of storage. Fillers used in the formulation of the impression compound described by Schoonover and Dickson were mixed and dried to constant weight over phosphorus pentoxide (phosphoric anhydride). On storage at 65° C. for one month, no loss in weight of the fillers took place.

TABLE 2. *Deterioration of hydrocolloid, alginate type, 12s:impression materials after storage for 30 months*

Material	Laboratory storage conditions	Setting time (minutes)	Permanent deformation after 12 percent strain* (percent)	Compressive strength one hour after mix** (lb. per sq. in.)
D-P elastic impression cream	Tested on arrival	3 2/3	2.3	121
	30 months at 5-50° C.***	4	2.8	123
Kalginate	Tested on arrival	2 1/2	2.2	80
	30 months at 5-50° C.***	2 1/2	2.3	86
Zelex	Tested on arrival	3 1/2	1.3	61
	30 months at 5-50° C.***	Did not set		
	30 months at 21° C.****	3 1/2	1.8	56

*Maximum standard deviation = 0.09; maximum coefficient of variation = 4.1 percent.
**Maximum standard deviation = 1.1; maximum coefficient of variation = 6.7 percent.
***Kept in unheated storage room.
****Kept in constant temperature room at 60 percent relative humidity.

Loss of the gel-forming properties during storage is more likely to be associated with a change in the alginate component of the impression material. Sodium alginate is a linear polymer of the sodium salt of anhydro-beta-d-mannuronic acid of colloidal dimensions,[7-11] having recurring units of the formula $C_6H_8O_6$ and containing one carboxy and two hydroxy groups. The structure of alginic acid thus contains acid groups which decarboxylate (decompose with loss of carbon dioxide) almost completely at temperatures above 200° C.[12] Dry sodium alginate shows no change in weight on storage at 65° C. No evolution of carbon dioxide or noncondensable gas was observed on storage of impression compounds at 65° C., although the samples showed the usual deterioration. Hence, decarboxylation is not a likely cause for this change.

In order to determine whether the deterioration is due to a reduction in molecular weight (depolymerization) of alginic acid, which normally has a molecular weight of about 15,000, samples of sodium alginate were dried to constant weight and then stored at 50° ± 2° C. and 65° ± 2° C. for seven weeks. At the beginning and periodically throughout the storage period, samples of the alginate powder were removed and dissolved in water, and the viscosity of the solutions was determined. The

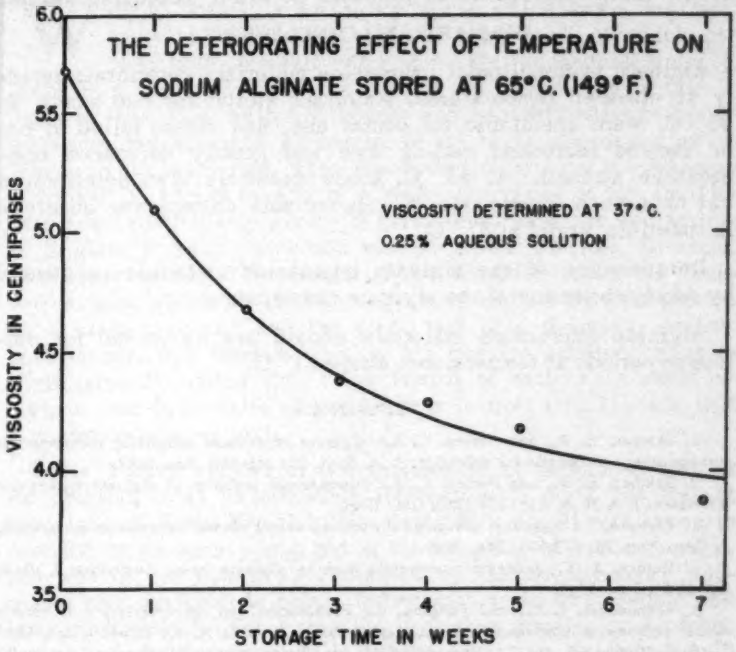

Figure 1.

solutions were made by adding 0.25 gram of alginate to 100 ml. of distilled water. The viscosity measurements were made at 37° ± .05° C. in a calibrated Ostwald-Fenske viscosimeter. The results of storing for seven weeks at 65° C. are shown in figure 1. The viscosity decreased with increasing storage time and was reduced by about 30 percent during this period. On storage at 50° C. the decrease of the viscosity was considerably slower but still observable. After three and one half months the viscosity was reduced by 40 percent. The decrease in viscosity was attributed to depolymerization of the alginate at elevated temperatures.

A decrease in the viscosity of aqueous solutions of sodium alginate on standing has recently been observed by Diaz and Aeulle.[13] The authors also attributed this phenomenon to depolymerization of the dissolved alginate. The depolymerization appears to be a chain reaction, because Diaz observed that it is inhibited by phenol, a typical chain terminator. The depolymerization may take place by an exclusive breaking of terminal links or a random scission (i. e., all bonds are split with equal ease). Either mechanism leads to products of lower molecular weight.

SUMMARY AND CONCLUSIONS

Alginate hydrocolloidal impression materials deteriorate rapidly at elevated temperatures. Materials stored for one month at 65° C. were unsuitable for dental use, and either failed to set or showed increased setting time and greatly decreased compressive strength. At 50° C. these materials also deteriorated but at a much slower rate. No appreciable change was observed in materials stored at 37° C.

Deterioration of the alginate impression materials is caused by depolymerization of the alginate constituent.

Alginate impression materials should not be stored for prolonged periods at temperatures above 37° C.

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HEALTH AS THE FIRST LINE OF DEFENSE

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WHILE health is an entity about which there has been much philosophizing and the importance of which has been both generally and pointedly recognized, actually there is a proneness upon the part of the human race to take it more or less as a matter of course and to really realize its importance, not so much by reason of its being possessed as by reason of its being lost. When one comes to consider the estimate accorded its import by men of wisdom, the views of two individuals seem particularly worthy of being cited: one, the declaration of England's great nineteenth century Prime Minister, Disraeli, who observed that "The health of the people is really the foundation upon which all of their happiness and all of their powers as a state depend," and the other that of a twentieth century philosopher, Will Durant, who, in his treatise entitled "What is Civilization?" stated that "The health of nations is more important than the wealth of nations." It is from this keynote that I desire to take my text.

While I have spoken of the inclination of people to take it for granted, it is nevertheless interesting to point out that at the close of World War II in the year 1945, a poll was taken in America by an agency engaged in the sampling of public opinion, and one of the questions contained on the questionnaire submitted was designed to obtain information as to what people had been most thankful for during the year then drawing to a close. It was generally assumed, I believe, that the majority would have answered that they were most thankful for the war's having ended. This was not to be the case, however, for of the number responding to the questionnaire, 52 percent, far and away the greatest number expressing a unanimity of opinion, said they were most thankful for health, while only 18 percent of those responding to the questionnaire gave the termination of the war as the condition for which they were most thankful.

ECONOMIC ASPECT OF HEALTH

Health not only makes a great difference to the individual but to society and, from a coldly materialistic viewpoint, to society

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from an economic standpoint. The debit upon the ledger of productivity cannot be reckoned solely in terms of the loss of individuals singly, when for reasons of health they are incapacitated for engaging in their normal pursuits, account must also be taken of those whose time and energies must be devoted to their care. In the armed services of America the ratio of staff to patients in general hospitals is from one and one-quarter to one and one-half to one. In other words, one and one-quarter to one and one-half well people are required to take care of one sick person. The ratio is two or more to one in civilian hospitals.

The maintenance of health or the prevention of disease and injury was for long inadequately stressed in medical school curricula in the United States, and unless there has been a recent radical change, it is still inadequately stressed. As late as 10 years ago about one third of the 72 medical schools then in existence in America did not regard preventive medicine of sufficient importance to devote any time to it in the regular curriculum, while 21 schools devoted a limited time to it in connection with some other course and only 32 ascribed to it sufficient importance to give it separate and distinct identity.

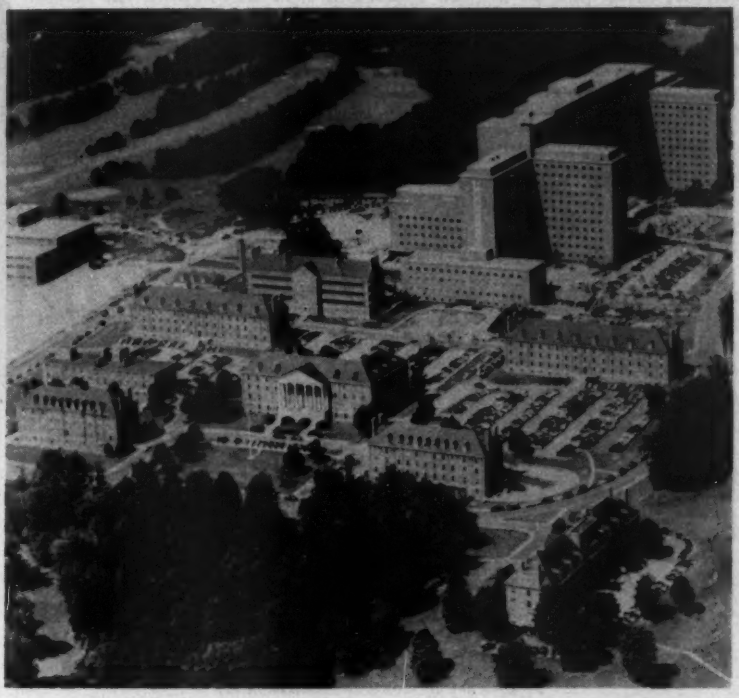
Health plays a major role in the standard of living of any nation. There is no doubt that its importance has of late come to receive more nearly the recognition due it. The existence of the many health agencies and edifices now in being is a manifestation of this recognition. Witness, for example, the magnificent group of buildings that house the National Institutes of Health at Bethesda, just north of Washington, D. C., in Maryland. The creation in 1946 of a World Health Organization is additionally pat to the point.

LIVE MORE AND LIVE LONGER

An individual is considered normal only when in a state of health. Any departure from it must be regarded as a departure from normal. It seems worthy of being pointed out, albeit, that health cannot necessarily be accurately defined as merely the absence of disease or infirmity but rather there must be taken into account the individual's complete physical, mental, and social well-being and that there are varying degrees of health. Therefore, it is not merely a static state to be maintained but is one that lends itself to improvement. In fact, the philosophy of living more is, in my estimation, on a par in importance with living longer. Thus does it follow that a healthy individual not only stands a better chance of living longer, but no less better a chance of living more.

There are several interesting and at the same time significant points which bear upon the entity of health. One is that the

natural trend throughout the normal life span of all living things, I believe, is toward health. Normally functioning physiological processes of the human being tend toward a state of health, as witness recovery following acute illness and repair following trauma or tissue destruction. A second noteworthy and fortunate thing about health is that its promotion and preservation may in



THE NATIONAL INSTITUTES OF HEALTH, BETHESDA, MD.

In this aerial view the Clinical Center is at the upper right, the Administration Building, center, and the National Cancer Institute in the right foreground.

so large a measure be favorably influenced by natural and gratuitous circumstances or elements, such as fresh air and sunshine. Thirdly, it is interesting and at times astounding to consider how man, the most intelligent of all animals, is more prone to indulge in excesses and practices he well knows to be detrimental to his health than any other creature. Man can certainly clutter up his immediate surroundings too as quickly and as completely as any other animal, and his state of personal hygiene and cleanliness, if not closely attended, will, with amazing promptness, become loathsome.

EFFECT OF DISEASE ON HISTORY

I think there is no more effective way of emphasizing the importance of health than by pointing out how its absence or lack has affected the course of history. One is well within the mark, it is believed, when he undertakes to show that factors of health or its opposite, disease, however one chooses to consider the matter, have played a more important role in shaping the destiny of the human race, the course of history if you please, than has war or the machinations thereof.

"THE PLAGUE"

An engraving by Gerard Andran (1640-1703) after Pierre Mignard. (From the Library of Congress collection.)

In earlier centuries the weakness of unscientific medicine profoundly affected political, economic, and social world trends. Disease has played both hero and villain and has effected both comedy and tragedy in the drama of the human race. The failure to control disease has often governed the course of empires. Thus, according to authenticated history, schistosomiasis had so debilitated Egypt by the thirteenth century B. C. as to permit the Jewish race to escape their vassalage and to make later their great independent contributions to thought and morals. Plague hurried the dissolution of the great culture of ancient Greece and the full benefits of Greek philosophy and knowledge were consequently lost to mankind for a thousand years. Pericles and the golden age of Athens succumbed not to man but to the

plague which, in a period of two years, destroyed more than one third of its population of 300,000. The dissolution of the Roman Empire was occasioned not only by the destructive forces of war and internal weakness but was unquestionably hastened by the great plague which raged in the third century for a period of 15 years and reduced the city population of the empire by one half. Plague, smallpox, typhus fever, typhoid fever, cholera, and malaria have struck indiscriminately at country after country, at pagan and Christian, kings and beggars, masters and serfs alike. Pestilence stayed the advance of the Hun into Western Europe and permitted Christianity, with its concept of the dignity of man, to spread throughout Europe. Pestilence attacked Byzantium, spurring on the Arabs who were thus enabled in the name of Allah to penetrate Europe. Pestilence frustrated the efforts of the Crusaders to spread the Christian creed along the Mediterranean and allotted to Christians the thorny crown of disease and infection instead of the Holy Sepulcher.

During man's entire existence he has struggled not only to adapt himself to his physical environment but also he has had to overcome the powerful opponents—war and disease. Today the armamentarium of the physician is better than it has ever been. It is vastly superior to that of even a few years ago but it is still not all that we would like. We appear to be winning our struggle against disease and we hope that in the not so distant future man's evolution will not be only a matter of physical adaptation but also a matter of spiritual progress—an ideologic freedom. There are those who would contend that there are no incurable diseases but only some for which man has not yet found the cure. The history of human progress, it will be observed in passing, is a history of ideas and an expression of reaction relative thereto.

FIRST RESPONSIBILITY OF MILITARY MEDICINE

The importance of health is nowhere greater than in the military. A cardinal purpose of military medicine has always been to conserve manpower and to promote and preserve the health of military forces. I count the prevention of disease, the keeping of personnel well and whole, to be indeed the first responsibility of the medical departments of the armed services. With the advent of the current concept of war it cannot be gainsaid, however, that health is any less important in civilian populations than in the military. Therefore, it becomes apparent that a country's first line of defense is the health of its citizens. The extent to which the importance of the specialty of industrial medicine has been recognized and developed in recent years is an attestation of the appreciation with which this fact is sensed. It is interesting to contemplate how the more industrialized a nation becomes

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the closer is the producer brought to the consumer in terms of a common interest.

A consideration of this resource as a medium through which not only the people of one nation but the populations of a group

AESCULAPIUS, THE PHYSICIAN, AND TELESPHORUS

Aesculapius, according to Greek mythology, was slain by Zeus who was fearful he might make all men immortal. Telespborus, often worshipped with Aesculapius and Hygeia, was the god of convalescence. (From the marble statue in the Louvre.)

of nations come naturally to a communion of minds, would seem to follow more or less as a matter of course. Health is something about which all nations and people are in accord. No one is opposed to it. Therefore, the potentialities inherent in the matter of health as a common meeting ground for the nations of the world and as a catalyzer for world peace come to the fore. For untold

centuries the forces of mankind have failed to bring peace to the world. The lawmaking agents and agencies of nations have failed and religion, from which much more might have been expected in this regard, has certainly failed dismally. In fact, religion has played a provocative role in a great deal of the mortal conflict that has gone on in the world and particularly right here in the continent of Europe and in the Middle East.

And so one is left with a wonderment if the forces of Aesculapius, the forces of medicine, of whose far-reaching and potent effectiveness there seems little question, should not be utilized to a greater extent. Acceptance of the doctrine that the language of the good Samaritan is a universal language would appear to be virtually inescapable. Therefore, does it not follow as a natural contention that this doctrine not only be given an unrestricted chance but be promoted as a dominant factor in the world-wide dissemination of good will. That it is possible to engender more good will abroad through the medium of a box of pills in the hands of the right kind of physician or a scalpel in the hands of the right kind of surgeon than would be possible by all of the hydrogen bombs and other instruments of annihilation put together, will be argued by few, if any. No group of medical agents is better qualified or more advantageously situated to perform this type of mission than the medical members of the military services. Such practices on the part of medical department personnel of the armed services, as well as by medical missionaries, have already engendered and are continuing to engender a great deal of good will throughout the world. However, how long the good will so inculcated or the esteem so occasioned will endure are, in a large measure, dependent upon how wisely and well our diplomats follow through and carry on.

WORLD PEACE THROUGH WORLD HEALTH

I am sure that medicine alone could never accomplish singlehandedly in this regard anything like what it could accomplish in conjunction with educators, lawyers, diplomats, engineers, and ministers, and I wonder if there is as close collaboration as there might be between the members of the various professions and callings in the furtherance of this idea. I can visualize more significant and more substantial progress being made toward world peace by the co-ordinated efforts of these several agents or agencies as a team than has ever been realized by past independent and unrelated practices. As fantastically amazing as has been scientific progress during the first half of the twentieth century, it is entirely conceivable to me that with the advent of atomic power and the potentialities to which it is the key, were the scientists of the world to devote all of their time, energies, and intellects to constructive pursuits, the second half of the

twentieth century might witness developments and progress that would leave the accomplishments of the first half looking puny by comparison.

But to return to a further consideration of certain facets bearing more directly upon my subject, I would remind my listeners that the concept of preventive medicine as developed in the armed services is due in a significant measure to the triumphs achieved over many indigenous communicable diseases. These triumphs were achieved by the employment of a wide variety of measures and methods, including not only better personal and environmental hygiene, but protection by vaccination against a formidable assortment of contagious diseases, many of high virulence and lethal potentiality. Another circumstance from which the concept of preventive medicine as developed in the armed services stems has been the widely expanded commitments that have brought service personnel into contact with all manner of diseases prevalent in foreign lands.

NEW GOALS

Important new goals come to the fore. It is not enough to strive to equal the spectacular progress of the past by traveling along similar lines and seeking as we may an ever-closer approximation to perfection. To live in health in the world of tomorrow we must set our sights on new and radically different horizons. The new concept abandons the restricted objectives of health measures applied only within our own boundaries and extends them to meet the needs of the family of nations now working in league with the United States. In the past if the British Navy were healthy and strong, peace in the British Empire could be realized, and if America's armed forces and its people were healthy and strong, peace in our land was assured. It will be a different story in the world of the future where objectives will be achieved by nations working in concert. Weakening of any member of the family of nations by shortcomings in the principles of health will weaken the structure of the whole family that seeks to live in a world at peace. Procedures for meeting preventive medicine problems within the confines of our own nation per se will not suffice in an era of international endeavor, whether that endeavor be slanted toward peace or war.

Aside from and beyond the principles involved in better public health, epidemiological, or preventive medical measures, a lowered mortality rate and a longer life expectancy have been and are being contributed to by better therapeutic principles and practices. Certainly the advent of the antibiotics has been of tremendous value in this regard. I use the term "value" somewhat advisedly, however, because it is my conviction that in many

instances the use of antibiotics has bordered closely upon malpractice. I refer to the indiscriminate use of these agents for the treatment of traditionally trivial conditions, thereby sensitizing the individual to such extent as to contraindicate a future use of these medicaments under circumstances of an urgent, sometimes vitally urgent, nature.

While it may appear somewhat paradoxical to my theme, I would like to cite at this point what I believe to be a fundamental factor in the unrest or inordinate attitude that appears to obtain particularly among the younger element of doctors in America today. I am not aware of how the situation in Europe compares with that in America insofar as the incidence of acute medical and surgical conditions is concerned—I suspect the conditions on this side of the Atlantic and our side are quite closely parallel. Anyway, in America, with the advent of the antibiotics and many other improvements in the management of diseases to which the human being has been prone, there has been such an amazing reduction, and indeed disappearance, of so many of the conditions that formerly and for so long constituted great challenges to the profession of medicine, that now the physician finds himself all dressed up with no place to go, so to speak. It is difficult for the younger physician to become reconciled to the concept that he also serves who only waits and watches, or for the young board-certified surgeon to realize that far greater, although perhaps less glamorous, is the contribution to the welfare of mankind of the epidemiologist or preventive medicine specialist who is engaged in the business of preventing people from becoming ill in terms of thousands, while he, the surgeon, is engaged in the more glamorous and exciting specialty of either saving or losing lives one by one. This circumstance to which I have just referred is, I am sure, a contributing factor to the antipathy for service with the military that has been, for the greater part of the past decade, so evident, in America at least.

HEALTH AND ENVIRONMENT

Now just as there are two sides to more things than a coin, there are two sides to this story of better health. I made earlier reference to man's struggle to adapt himself to his physical environment. The other side of this story concerns itself with the fitting of the environment to the man, and by this I do not mean to limit the account taken to matters of health per se but to the matter of dietary productivity—the provision of food for man's sustenance. For what profit is there in improving the health and increasing the average life expectancy of a race of people without taking account of the necessity for the provision of adequate sustenance? A political economist by the name of T. R. Malthus, who lived between the years 1766 and 1834, point-

ed out the implications upon this score, and I think most of us are familiar with the Malthusian theory. There is more than one interpretation to the asseveration that the measure of the world is man. Since the profession of medicine is, to a greater extent than any other profession, responsible for people living longer and therefore increasing the consumer component, is a major responsibility for rendering more of the earth's surface habitable and productive through an improvement of health standards, by a similar token, not a responsibility of the medical profession? If this is a valid concept, and it would appear to be, it devolves upon the disciples of the profession of medicine to concern themselves not only with life per se but with bread, the staff of life, as well. By pursuing this policy we as doctors will be instrumental in the creation of a man-environment combination physically and industrially strong enough to produce as well as simply to consume.

And so there becomes apparent the logic inherent in the doctrine: first, that as a national resource health is second in importance to no other; second, that the physical and psychological health of the people of our several nations will, in its many aspects, be the measure of our world power and leadership; third, that it is incumbent upon physicians the world over to collaborate with the political leader, the sociologist, the economist, the educator, the clergy, in order that individual and united effort toward economic, sociological, physical, mental, and spiritual health among all of our people may be evoked. With such approach the words of Shelley could become a reality:

> And science dawn though late upon the earth;
> Peace cheers the mind, health renovates the frame;
> Disease and pleasure cease to mingle here,
> Reason and passion cease to combat where
> Mind unfettered o'er the earth extends
> Its all-subduing energies, and wields
> The sceptre of a vast dominion there.

MEDICAL PLANNING FOR CIVIL DEFENSE

At a turning point in history, when the world seems to rotate around the threatened use of weapons of mass destruction and biological and chemical warfare agents, there is a woeful lack of adequate local planning for the emergency care of potential civilian casualties. The number of casualties resulting from an atomic attack will stagger the imagination when compared with the casualty figures of previous wars.

—CARLISLE S. LENTZ, M. D.
in *Hospitals*,
p. 65, Apr. 1954

PLASMA EXPANDERS IN THE ARMED SERVICES OF THE UNITED STATES

LUTHER G. BELL, *Captain (MC) USN*

ABOUT 4,000,000 units[1] of whole blood are being used annually by our civilian population. Military estimates[2] for shock solutions are as high as one pint per year for each person in the armed services. The Federal Civil Defense Administration has set a stockpile goal of 7,500,000 units of plasma expanders for civilian[2] use.

Rhoads[3] estimated that 300,000 units of blood or plasma would be needed for casualties caused by one Hiroshima-type bomb dropped on Philadelphia. His figures, though only estimates, show the need for a suitable plasma volume expander. National interest in plasma expanders stems from the loss of blood due to war and the chance of atomic attack on our civilian population.

Plasma expanders were used in World War I and to a greater extent in World War II. In 1942 the Blood Substitute Committee of the National Research Council set up standards for a satisfactory plasma expander. Their criteria were: (1) maintenance of a satisfactory colloidal osmotic pressure within the circulatory system; (2) constant molecular composition; (3) suitable viscosity; (4) stable within a wide range of temperature changes; (5) stable in storage for long periods of time; (6) easily sterilized; (7) nonpyrogenic; (8) nonantigenic; (9) nontoxic to tissues, early or delayed; and (10) inexpensive and reproducible in large quantities for stockpiling.

Various substances in five general groups have been used as plasma expanders. Some of these are being evaluated clinically and others have already been evaluated. With such a variety, it is safe to predict that further research will uncover new and perhaps even better substances as plasma expanders. Some of the substances investigated approach the standards set up by the Committee. Their present status is outlined in table 1. Dextran, gelatin, and polyvinylpyrrolidone (PVP) meet many of the standards and will be discussed in this article.

DEXTRAN

Dextran is a macromolecular product of the sugar beet industry and is formed by the action of a nonpathogenic contaminating

From U. S. Naval Hospital, San Diego, Calif.

TABLE 1.

Types of plasma expanders	Plasma expanders	Status
Human blood derivatives	Whole plasma	
	Serum albumin	High cost and short supply
	Modified globin	Uncertain blood pressure response
	Hemoglobin solution	Kidney damage
Plasma substitutes	Gelatin (clinically effective)*	
	Isinglass (ichthyocolla)	High reaction rate, inferior to other gelatins
	Casein digests	Investigation incomplete
	Ascitic fluid	Impractical source of origin
	Acacia	Antigenic, possibly harmful storage in the tissues
	Pectin	Excessive storage; requires buffering before use
	Dextran*	
	Polyglucose	Poor blood pressure response

	Polyglucose	Poor blood pressure response

TABLE 1.—Continued

Types of plasma expanders	Plasma expanders	Status
Plasma substitutes	Methyl cellulose	Excessive tissue storage, produces kidney damage
	Polyvinylpyrrolidone (PVP)*	
Crystalloids (Used to complement the approved blood derivative and plasma substitutes.)	Saline solution	Short blood pressure response
	Sodium lactate solution	Short blood pressure response
	Dextrose (d-glucose) solution	Short blood pressure response

*Status is under investigation and use by the National Research Council and the armed services.

bacterium, *Leuconostoc mesenteroides*, on sugar slime. Grönwall and Ingelman,[4] Swedish researchers, developed and used dextran clinically in 1944. Since then many British and American researchers have studied the properties of dextran and reported on its clinical use.

During the Korean campaign homologous serum hepatitis developed in a high percentage of the wounded given plasma. As a result, the Surgeon General of the Army directed that dextran replace plasma for operational use and stockpiling. Its use has likewise been extended to the medical departments of the Navy and the Air Force. All military hospitals have or can obtain dextran for clinical use. Other medical units not having whole blood available rely on dextran to combat traumatic shock.

Dextran has been used by the armed services in hemorrhagic, traumatic, and neurogenic shock, as operative support, and to extend blood.[5-7] Results have been good with a minimal reaction rate. It has been my experience as well as that of others[8] that in hemorrhagic shock, where blood volume loss is from 20 to 30 percent, dextran works well. Whole blood may be spared if hemorrhage has been controlled.

Amspacher and Curreri[9] in 1952 reported using dextran in about 60 Korean battle casualties with satisfactory results. They believed that patients with mild to moderate blood loss can be treated with dextran alone. Severe blood loss required dextran plus whole blood. They reported that many of these patients could be maintained in first-aid stations and transported to the hospital before receiving blood. This is a valuable adjunct in the treatment of the wounded. It should save many lives because it is more practical logistically to keep dextran at the front than blood.

The Army Surgical Research Team in Korea has subsequently given dextran to about 1,000 battle casualties with satisfactory clinical results.[2] This substantiates the results of Amspacher and Curreri. Our hospital ships in Korea used dextran less than our ground forces. Blood was usually readily available on the ships and undoubtedly due consideration was not given to dextran as a blood extender.[10]

There seem to be no serious toxic effects from the administration of dextran. About 60 to 70 percent is excreted by the kidney, 20 percent in the expired air, and two percent via the intestinal tract. What remains is probably metabolized.[11] Anaphylactoid reactions, when they occur, are usually not severe and are less frequent in the anesthetized than in the nonanesthetized patient.[12]

"Preliminary reports from the Army Medical Service Graduate School, Washington, D. C., indicate that dextran in certain amounts does measurably prolong bleeding time in a significant percentage of people receiving it. This is preliminary work and will be reported on subsequently in greater detail. It is suggested, though, that those having occasion to use this material be observant as to the possible occurrence of an excessive bleeding tendency occurring six to 18 hours following infusion with 1,000 cc. or more of the material."[13]

Rhoads discussed two cases of postoperative hemorrhage in patients who received dextran and suggested the agent might be the contributing cause. It should not be given subcutaneously or intra-arterially. Neither should it be given to patients with severe cardiac conditions, nor to those with lower nephron nephrosis or severe kidney damage.

Ede[14] tells of a patient who received dextran in the radial artery at the wrist. The patient was exsanguinating from a femoral laceration when cardiac arrest occurred. Dextran was given intra-arterially before blood could be obtained. The following day the forearm was black and blue, and later became gangrenous, requiring amputation. The catastrophe was presumably due to replacement of blood in the forearm by the viscid dextran, resulting in thrombosis of the vessel and death of the part before circulation could be restored.

Dextran has been used with increasing frequency at this hospital. One hundred and seventy-two units have been given to about 100 patients. Ninety-five percent was given for hemorrhagic and traumatic shock. The remainder was used to extend blood, or given to patients who failed to respond when given what seemed adequate blood. Ninety-two percent of patients receiving dextran also received blood.

In general, results have been good with no bad clinical effects. Dramatic results were noted in two patients suffering from shock, one with bile peritonitis and one with intestinal obstruction that had not responded to blood. Another patient, during disarticulation of his hip, had a transfusion reaction and went into shock. The blood was discontinued and dextran given. Blood pressure returned and the operation progressed without further trouble. A fourth patient, following total pancreatectomy, suffered prolonged shock. This patient was not given dextran; he may well have responded to it, had it been given.

Craig and associates[15] have pointed out how expanders are used at the Mayo Clinic in patients undergoing sympathectomy for hypertension. After operation blood pressure was maintained better, and the second stage operation could be done earlier than

when blood alone was used. Morbidity was lessened and hospital stay was shortened. Lundy[16] advocated the use of a plasma expander with blood. He stated patients did as well with one unit of blood plus one unit of a plasma expander, as from two pints of blood. He called it "balanced supportive therapy."

GELATIN

Hogan[17] in 1915 used gelatin saline infusions in the treatment of shock. "Bayliss[18] discouraged its use on the grounds" that "because of its origin in animal hides it might transmit tetanus and anthrax spores."

Since World War II, gelatin products have undergone extensive studies, especially in civilian institutions. They are well established as satisfactory plasma expanders, with certain limitations. The main objections to gelatin from a military standpoint are its high gel point and its molecular degradation when transported under high temperature conditions. These factors may render the substance useless or relatively ineffective in advanced military positions. In military or civilian hospitals in the United States these factors can be controlled.

Ravdin[19] pointed out other objections to gelatin; *i. e.*, that (1) the unexcreted portions may not be metabolized, a point still under debate; and (2) gelatin interferes with the typing and crossmatching of blood. The latter difficulty may be overcome by the use of one drop of one percent of glycine on the slide of the recipient's blood to prevent pseudoagglutination. Despite these objections, he concludes that gelatin shows promise as a plasma expander.

Several types of gelatin have been prepared and used as plasma expanders. Knox P-20 gelatin becomes a gel below 80° F., and must be heated before administration. To overcome the high gel point, oxypolygelatin (OPG) and modified fluid gelatin (MFG) have been prepared. OPG remains fluid at room temperature and gels at 50° to 55° F. Modified fluid gelatin remains liquid at heat levels of 32° to 40° F. There is, however, some indication that improved gelation of these preparations further sacrifices the melting point, viscosity, and molecular structure when stored.[20]

Gelatin has not been used very much in the military service. Higgins and associates[21] reported the use of OPG in 50 patients. Of seven patients in shock, six showed a favorable blood pressure response without febrile or allergic reaction. Forty-three normal volunteers receiving OPG excreted 50 percent in the urine at the end of eight hours, and traces could be detected at the end of 24 hours. However, some 35 percent of the administered gelatin could not be accounted for during this period of time. Five

allergic type reactions occurred, none severe. Patch tests performed after infusion were negative. The fate of the unaccounted-for OPG was explained by diffusion into the extracellular fluid spaces, chemical degradation, or tissue storage. No difficulty was encountered with blood typing and crossmatching after infusion of 500 cc. of OPG.[22]

Modified fluid gelatin has been used in a few battle casualties in Korea. Sixty-four units were given to 34 patients without toxicity. The substance was rapidly excreted in the urine—65 percent by the end of six hours. Although no definite conclusion could be drawn from the series of patients infused, it was believed that a material of high molecular weight would be more desirable.[20]

POLYVINYLPYRROLIDONE

Polyvinylpyrrolidone (commonly known as PVP) is a synthetic, water-soluble polymer manufactured from a mixture of acetylene, ammonia, and formaldehyde under pressure. It is ascribed to the research of Hecht and Weese, and was used as a plasma expander by the German Army in World War II. Although it was reportedly used in 500,000 cases, American specialists sent to Germany in 1951 could find no precise evidence to justify this contention.[19]

PVP has been used in the treatment of shock and burns, during surgical operation, and experimentally by different investigators. It is generally agreed that many of the criteria for a satisfactory plasma expander are present in this substance. However, the effects of prolonged tissue storage have not been resolved. Bader and associates[23] as well as Zollinger and Ellison[24] found that in man about 50 percent of the infused substance is excreted in the urine the first 24 hours, and that minute amounts are voided daily for an indefinite period of time. Fine's[20] investigative work using C-14 and I-131 PVP parallel these findings. One of his patients still excretes small amounts of PVP (2.5 mg.) daily in the urine after two and one-half years.

The excretion of PVP is related to variations in molecular size. Urinary excretion and blood disappearance of PVP vary inversely with the molecular size of the polymer,[25] and the relation between viscosity and molecular weight has been termed the K value.[19] PVP with K value below 27 is totally excreted within two to four days, while types with higher values are not totally excreted. The optimal K value for PVP has not been determined but probably falls in the range of 27 to 40. Work is being continued by Fine and his associates to ascertain the optimal value for clinical use.[25]

Tissue changes allied to PVP retention are being studied by the Pathology Committee of the National Research Council.[20] Time and material have not permitted conclusions relative thereto.

PVP has not been used clinically by the medical departments of the Armed Forces so far as I have been able to ascertain; however, the material has been approved for stockpiling by the Council for the Department of Defense and the Federal Civil Defense Administration for emergency use only.

USE OF PLASTIC BAG FOR PLASMA EXPANDERS

The plastic bag has been developed and is being studied for the administration of plasma expanders in the armed services. Evaporation of the material from the bag has been overcome through the use of aluminum foil. The bag is a practical idea because shipping weight has been reduced by one pound per a 500 cc. unit of dextran. Shipping and storage space is less. Another advantage is that a unit can be carried by a first aid man into the front line of battle. Compression of the bag at the time of administration expedites the flow of the expander into the patient and prevents the possible hazard of air embolism. The bag can also be used for dispensing blood, for which it has advantages similar to those mentioned above.

SUMMARY AND CONCLUSIONS

The use of plasma volume expanders should be encouraged in military and civilian hospitals. They extend blood, combat shock prophylactically, and treat hemorrhagic shock with mild to moderate blood loss.

Dextran has been approved for use as a plasma volume expander by the armed services of the United States. It may replace plasma entirely unless the danger of homologous serum jaundice can be controlled.

The gelatins have been used by the armed services to a limited degree. Although effective, they fail to meet all of the requirements for stability, shipping, and front line needs.

PVP is likewise an efficient expander but has the disadvantage of tissue storage, the ultimate significance of which is not clearly understood. It should be used for emergencies only.

Judging from my experience, patients who do not respond to adequate amounts of whole blood should be given one of the approved expanders unless there are contrary reasons.

Expanders are not blood substitutes. Their use should in no way influence our national blood program.

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Of the casual vices which I wish to discuss briefly in relation to old age, perhaps alcohol is the most important. It is generally agreed that although alcohol is not contraindicated in the aged, the tolerance for it diminishes in the later decades of life. Chen has shown experimentally that the average lethal dose of alcohol as determined in a large number of mice is inversely proportional to their age. What's bad for old mice must be bad for old men!

—RUSSELL L. CECIL, M. D.
in *Journal of American Geriatrics Society*,
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ADJUSTMENT TO THE ARMY

The Soldier's Identification With the Group

EARLE SILBER, *First Lieutenant, MC, USAR*

A PSYCHIATRIST for a mental hygiene consultation service in an army training center has an unusual opportunity for the study of persons who have difficulty in adjusting to a new social and environmental setting. The training center to which I was assigned received men entering the army from civilian life who were assigned for basic training in the Army Medical Service. Because of the location of the consultation service at the center within the training area, there was opportunity to learn about soldiers who were referred as problems and also those who were aole to make a satisfactory adjustment without benefit of psychiatric consultation. Serving as medical officer during "sick call" provided, among other things, additional opportunity for understanding the problems some soldiers have in a training camp.

In reviewing my experiences as a military psychiatrist, I have been struck repeatedly with the importance of observing the soldier's attitudes toward his group and his interaction with the group in order to understand more fully his capacity to adjust to military life. In this article I have attempted to present a summary of this problem. It was written to emphasize an important area of needed research: understanding the process of group identification as a sustaining factor in human behavior.

PRESENCE OF SYMPTOMS VERSUS ABILITY TO FUNCTION

It has been a common observation that success or failure in adjustment to military life in a practical sense has no constant relationship to the presence of manifest psychiatric disorder. Studies of many persons repeatedly demonstrate the fallacy of equating failure in the military setting with the presence of psychiatric symptoms. Many soldiers appear to be able to adjust in spite of either physical or emotional limitations while others with seemingly minor disabilities appear to be incapable of making a satisfactory adjustment.

It is important that in estimating the severity of a person's emotional disturbance, one make an assessment of the total

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personality and its resources along with its areas of disturbance. In the military setting, it is obvious that emotional disturbance need not prove to be incapacitating in terms of the soldier's ability to function and perform his duties successfully. This was illustrated by re-evaluation examinations in which unit commanders were requested to refer to the clinic soldiers who had a manifest psychiatric disorder at the time of induction (designated by an S-3 profile[1] in their records) but who appeared to be functioning adequately after from eight to 10 weeks of training. This involved almost every trainee so designated, and in almost every instance these men had, in a practical sense, been functioning well in spite of the presence of recognizable symptoms. They had not lost time from training, had not been on sick call for their symptoms, had not come to the attention of the training center psychiatrist, and had been able to participate in aspects of training usually considered most anxiety-laden, such as participation in weapons and bayonet training, the infiltration course, close combat course, et cetera. Many soldiers in this group demonstrated their attitude of wanting to do their best in spite of certain symptoms, minimizing the significance of the symptoms, and wanting to remain with the group. As an interesting corollary, many soldiers who presented serious problems in the training center, had no notation in their record of manifest psychiatric disorder at the time of induction. It is recognized that these observations were not made as a result of any over-all statistical study, but nonetheless were believed to be so repetitive and striking as to be noteworthy.

The severity of a psychiatric illness is a relative concept; it represents a degree of maladaption to a particular environment at a particular time. Under certain situations, psychiatric disorders may only exist in covert form because of the compensating interaction between the environment and the person, while under other circumstances it becomes crippling because of the stresses and anxiety-provoking disharmony between the environment and the person. Similarly, the degree of maladjustment resulting from physical disability cannot be understood unless one is aware of the interaction between the person with the disability and the social group.[2] The "severity" of a disability or potential disability cannot be understood unless one examines the problem from the point of view of the interaction of the total personality and the social setting and not just in terms of symptoms per se.

It is understandable, therefore, that examining a person in one setting may reveal him to be relatively free from disabling anxiety and give a false picture of his ability to adjust to a different setting. For example, there is generally much greater freedom for persons to act out problems in a civilian setting, provided that such behavior is accepted and does not meet with reper-

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cussions on the part of the environment. This is seen repeatedly in the life history of the very immature person whose infantile behavior and excessive dependency are actively fostered by significant figures in his family life, or in the life patterning of the generally inadequate person who lives in a social situation where little demands are made on him.

THE UNIQUE DEMANDS OF THE MILITARY GROUP ON THE SOLDIER

One aspect of understanding these problems involves a clearer understanding of the uniqueness of the social setting in military life. It is important to know what is demanded of the soldier in making a successful adjustment to military life that differs from his adjustment in a civilian setting. Some of the more obvious facets of military life to which adjustments must be made by the new trainee are: separation from significant figures in his personal life, interruption of previous patterns of sexual behavior, training in various aspects of aggressive warfare, lack of privacy involved in living in a barracks in close relationship with other men, absence of direct control in planning the course of his army career, loss of previous status, adopting new codes of social customs peculiar to the military, and living in a generally controlled authoritarian atmosphere.

Attitudes on the part of the group concerning particular types of behavior play an important role in determining success or failure in adaptation of some persons in this new social setting. As an illustration of this, compulsive promiscuity may, in a clinical sense, be an indication of underlying anxiety; but yet a person in a military setting whose problems are manifest in this particular way will probably find a high degree of social acceptance among many of his peers. More remains to be learned of the culture of the army and its standards of normalcy from the point of view of social acceptability.

There are considerable variations in concepts of a "good soldier" among military personnel in general. Group leaders influence the attitude of the group toward soldiers who manifest certain types of behavior problems or psychiatric symptoms of one type or another. The display of certain types of symptoms by trainees provokes varying types of responses (anxiety, hostility, sympathy, et cetera) among leaders who may be in a position to determine whether or not certain soldiers become failures in adjusting to the military. Among such psychiatrists in the services, irrational motives may influence their treatment and disposition of some soldiers as prematurely recommending their separation from the service because of the psychiatrist's own feeling of insecurity. The personality of the soldier himself cannot be separated from his interaction with others whose response to his

behavior may be instrumental in determining whether or not he will fail in adjusting to a certain situation. This aspect of the problem concerns attitudes stemming from the social group and being directed toward the person, and define to some extent the social situation in which the person must make his adjustment.

ATTITUDES OF THE SOLDIER TOWARD THE MILITARY GROUP

The second aspect of this problem concerns attitudes generated in the soldier and directed toward the group; or what attitudes flow from a person to the social group. It is my belief that investigation along these lines will point to answers of the question one is forced to ask repeatedly; *i. e.*, what is it that enables certain persons to function with symptoms of emotional or physical disability while others with seemingly trivial or minor disturbances are completely unable to function or function ineffectively?

The importance of "good motivation" as a factor enabling certain soldiers to function in spite of the presence of minor defects in military life is evident to those working in the field of military psychiatry. Because there are many obvious factors which influence motivation at a conscious level, all too often some of the unconscious determinants tend to be overlooked. One of the many ways of attempting to determine the cause of poor motivation is from the point of view of the soldier's attitudes relative to identification with the group. Poor motivation is only symptomatic of a disturbance in the interrelationship between the person and his social environment, and one must go beyond the surface manifestations of the motivational problem in order to ferret out what it really indicates. To the person concerned, his attitude may be completely justifiable and yet is symptomatic of maladjustment from the point of view of the total social situation. Indeed, the symptom, "poor motivation" in whatever way it is expressed (*e. g.*, the chronic "sick-book rider," the AWOL offender, the "gold brick") is as anxiety-determined as other symptoms of maladjustment but, unlike the neurotic symptom, represents a conflict between the ego of the person and the environment in which he is operating. It is believed that this question of motivation is correlated with certain attitudes or absence of attitudes on the part of the person toward the military group as a whole. Many people, in spite of various types of psychiatric disorders, are able to make a satisfactory adjustment to army life provided their problems do not infringe to a large extent on their need for group acceptance and their ability to accept the goals and aims of the group as their own.

More attention must be focused on understanding the way the army as a social group is symbolized and perceived by soldiers who manifest various types of character disorders. At the training

center, the character-disorder group constitutes the greatest percentage of men referred for psychiatric consultation with problems not only to themselves but to the group itself. Where the personality organization is such that there are strong needs for social acceptance and approval, albeit neurotic or anxiety driven in nature, persons may continue to perform effective service in the face of serious emotional problems.

One line of investigation might deal with the symbolic meaning of "the army" and how this is perceived by different personality types. For example, some soldiers may be able to use the army and the symbolic implications of being a member of this social group as a supportive, adaptive mechanism in the resolution of their own internal problems. Some men find that participating and sharing in a large, powerful organization offers a defense against anxieties stemming from feelings of isolation and may gratify unresolved needs for contact with the powerful, benign, and protective parent figure.

A very frequent mechanism of adaptation involves the phenomenon of "identification with the aggressor" described by Anna Freud.[3] Many persons fearful of authority figures resolve this problem by incorporation in their own personalities characteristics of the feared person in their environment. Through this process, persons may identify with attributes of authority figures symbolizing strength and masculinity and in this way increase their own internal feelings of security. This process is frequently seen in persons who become as "tough" in their interpersonal relations as their superiors and ward off anxieties related to them in this way. Bettelheim[4] described prisoners identifying themselves with the aggressive behavior of their guards as a mechanism of adaptation in extreme situations. Although not applicable in a real sense, this same type of situation exists in a psychologic sense in terms of the way the relationship of the trainee to his superiors is often perceived by the trainee.

On the other hand, this identification may be perceived as being dangerous and anxiety-laden. This was most clearly illustrated by a small group of conscientious objectors I saw in consultation and who presented an extreme point-of-view of categorically refusing to train even as noncombatant soldiers. It was apparent in studying them that there was a compulsive need to reject any identification with any aspect of "the army" because "the army" for them symbolized that which they found necessary to reject in themselves and because the very process of identification with this group placed them in a role which for them was anxiety-provoking. With this group, "the army" is perceived as the ultimate symbol of violence and destruction and their character or ego-organization is such that any awareness of

such feelings becomes a signal of anxiety. Obviously they generally have a passive orientation in their relationships to others. They represent an interesting group because they manifest problems in identification with the army as a social group at the far end of the spectrum and they are incapable of rendering any effective service whatsoever.

Persons with marked antisocial personalities also illustrate this problem in group identification and reflect in their attitudes to the authoritarian aspects of "the army," early disturbances in the process of identification with parents and their later counterparts in social groups. Immature, passive-dependent men experience considerable anxiety in the military setting when suddenly required to identify themselves with a masculine group, thus accentuating their own problems of masculine identification. They frequently present serious problems in a training center and may be more maladjusted in this type of social setting than those who are frequently thought of as being more sick in a clinical sense. As would be expected, they also experience difficulty in identifying themselves with an aggressive group and aspects of training which symbolize and involve stimulation of aggressive feelings. This may be applied also to the schizoid, withdrawn group where there is little manifestation of social hunger and need for acceptance by the group. Here the problem may be thought of as one in which early repeated trauma and rejection result in a personality organization in which closeness to others in a group situation and need for belonging become signals of anxiety.

Failure in adaptation may also occur if the soldier is assigned to a particular branch of the service which presents special problems in identification. This frequently was observed in a medical replacement training center where a "medic" was sometimes regarded in a feminine, passive role where maladjustment occurred because of great need for hypermasculine identification.

It is not to be implied that the presence of moderate degrees of character disorder inexorably results in failure in adaptation in the training situation. On the contrary, the problems of many soldiers may be resolved in such a way as to be useful not only to them but also to the group itself. Perhaps the supportive, sustaining forces which may be operative have not been stressed sufficiently in our attempt to understand problems of this type.[5] What should be emphasized is the importance of the group situation as one of the vital sustaining forces in military life. It is postulated that a common mechanism by which failure in adaptation occurs involves an inability of certain soldiers to make use of this sustaining force and that the lack of such ability distinguishes to a large degree those who fail in making a successful adjustment in the military setting.

IMPLICATIONS

It has been increasingly obvious that greater skills are required in being able to predict whether or not a person will be capable of making a successful adjustment to military life and more objective tools are needed than the psychiatrist has available now. It appears wise to adopt a more functional and empirical point of view, and to screen at the induction center only those persons who manifest overt, grossly disabling failures at adaptation. It has been observed that no matter how many "potential" failures are eliminated at the induction center roughly the same numbers of persons break down and require separation shortly after their induction. The best point at which to evaluate the capacities for adjustment appears to be after the person is actually in the military situation after a trial period of duty. Even then more validated technics are needed for making sound, more accurate predictions as to adaptability.[6]

Focusing attention on the problems of adjustment to the group and the problems of identification with the group has aided in the disposition of such soldiers. It is believed that such an approach is more realistic and pertinent to the over-all problem. Greater emphasis should be placed on how the patient's symptoms are incorporated in the personality and on his over-all adjustment to the group. It was important to focus any therapeutic endeavors on the current immediate situation and to attempt to mobilize as much as possible the person's own resources. Group therapy was especially effective in the training situation, both as a diagnostic and therapeutic medium. It is believed that one reason for its effectiveness was its value in facilitating group relationships in the therapy situation and subsequently in the particular unit to which the soldier was assigned.

The importance of understanding group and social mechanisms in the management of psychiatric casualties in combat is now an established principle in military psychiatry.[7] It is beyond the scope of this report to discuss combat psychiatry, but it is believed that there are certain implications of the experiences in this area which are pertinent. Discussing psychiatric treatment in combat areas, Ranson[8] stated:

> It was found to be of primary therapeutic importance to avoid breaking the patient's identification with his combat group. To this end, hospitalization was maintained within the division or in close proximity to it. Emphasis was placed on impending return to combat duty. Maintenance of identification with the combat group was facilitated by keeping the length of hospitalization short, by the attitudes of the psychiatrists, and by various orientation and educational measures. Army psychiatric centers carried on an active program of so-called "orientation and educa-

tion" designed to promote continued interest in the war, motivation to fight, and identification with the interests of the combat group.

Others have also pointed out the importance of the soldier's ability to integrate himself within the group as a determinant of his resistance to the trauma of combat.[9–11]

The most important implications of this approach point in the direction of further research in understanding the significance of group mechanisms as an important factor in human behavior. The Army mental hygiene consultation services offer an excellent setting for the study of problems as outlined in this article. A military situation can be used as a setting in which experimental hypotheses concerning adaptive behavior can be tested. Attempts to improve the criteria of predictability of success in military life can serve as a testing method for varying theoretical presumptions which are made about human behavior. Its value goes far beyond its immediate practical implications. There is much to be learned about the hidden positive resources of the human personality. The greatest application may lie in the area of preventive psychiatry by attempting to learn more of how group identification may be facilitated and therefore serve as one of the sustaining factors in preventing failures in adaptation.

SUMMARY

This communication has not intended to encompass an exhaustive survey in regard to problems in military adjustment but has focused on one area: certain problems in group identification and its relationship to understanding successful and unsuccessful adaptive mechanisms as they occur in the military setting. The hypothesis is offered that one of the broad common denominators in successful adjustment to military life depends on a soldier's ability to identify himself successfully with the army in whatever way it is symbolically perceived. Similarly, in a soldier's failure in adaptation to military life, one of the broad common denominators involves a disturbance in identification with the army in a particular manner which is disruptive and socially disuseful. A common mechanism by which failure in adaptation occurs involves an inability of certain persons to make use of group identification as a sustaining force in military life. Certain implications in regard to therapy in a military setting, problems in selection of personnel, combat psychiatry, the need for research, and the preventive aspects of this type of approach are pointed out. Emphasis is made in stressing group identification as a sustaining force in the military setting, and in the need for studying positive adaptive processes in human behavior.

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INDUSTRIAL COLLEGE OFFERS CORRESPONDENCE COURSE

Because adequate national security involves civilian-military teamwork, the Industrial College of the Armed Forces is offering a correspondence course, "Emergency Management of the National Economy," that explores the complex and interrelated economic-military problems that must be solved. The course is open to all Medical, Dental, Veterinary, and Medical Service Corps officers of all services, including regulars, reserves, and National Guard officers, and to a limited number of qualified civilians. Reserve officers receive 48 points for completion of the course.

Some of the subjects covered are basic economics, principles of administration, public support, morale, and security, raw materials, energy resources, public utilities and services, military requirements, procurement, foreign aid, U. S. economic foreign policy, administration of mobilization for World War II, and economic stabilization. All necessary texts are furnished by the College and may be retained by the student.

Further information may be obtained from the Correspondence Study Branch, Industrial College of the Armed Forces, Fort Lesley J. McNair, Washington 25, D. C.

THE ARMED FORCES MEDICAL LIBRARY

Its Services to Medical Officers

FOUNDED in 1836 as the Library of the Army Surgeon General's Office, the Armed Forces Medical Library now has the largest collection of medical literature in the western hemisphere and is among the five or six largest medical libraries in the world. After World War I the Library was renamed the Army Medical Library, and in the spring of 1952 the name was again changed to Armed Forces Medical Library. From its very beginning, in addition to serving military users, the Library has been available to and extensively used by civilian scholars. It serves as the national library of the medical sciences, and readers come to it from all over the United States and from all parts of the world.

The Library contains almost a million titles. Besides its outstanding collections of historical works, medical theses, and portraits and photographs of medical men, and its unique section of American and foreign government and statistical documents, the completeness of its volumes of periodicals make it a fountainhead of information surpassed by few other scientific libraries. Over 8,000 serial publications are currently received by purchase, gift, or exchange, including about 4,500 regular medical journals from all over the world. Altogether, about 100,000 journals and monographic pieces are acquired yearly, representing literature on medicine, dentistry, pharmacy, and the allied sciences, in all languages and of all times.

As the central medical library for the Department of Defense, its aim is to make available to medical personnel within the Department the resources of the world's medical literature which have a bearing on their professional duties. Knowledge of the services which the Library is prepared to give medical officers should, therefore, be widespread. These services fall into the following general categories: photoduplication work, interlibrary loans, information and reference services, and publications.

Photoduplication Services. The Armed Forces Medical Library will provide microfilms or photoprints of single articles in its journal collection free of charge to members of the armed services who need such copies for their official duties. Neither entire journal issues nor copyrighted monographs can be re-

produced without written permission of the copyright owner; nor can more than one copy of any work be furnished.

To obtain photoduplication service, the requests for microfilm or photostats must be made on an official order blank (AFML Form 48) which can be obtained from the Library. It should be filled out in duplicate giving the entire reference desired, and the original copy should be signed by the person requesting the service. The order form should then be sent to the local military hospital library for transmittal to the Armed Forces Medical Library. Where there are no local library facilities, the requests may be sent directly.

The Library receives about 100,000 photoduplication orders each year, which is the limit of its capacity at the present time. The number made by one person must be held within reasonable limits. Requests for convenience copies of materials available in local libraries cannot be honored; the Library serves as a library, and not as a mere copying service. Wherever possible, microfilm copies, rather than photoprints, should be used. Persons desiring research reports of the Department of Defense and other government agencies should request them from the issuing installation before requesting photoduplication copies from the Library.

Loans. The Library will make its materials available for loan to Department of Defense medical personnel on active duty within the continental United States. Books and journals are not loaned outside the United States. Officers on foreign service have access to the Library's journal collection through the photoduplication activity described.

Loans should be requested through one's local military medical library. Material will be sent direct to medical officers as individual borrowers only where there are no local library facilities. Request forms for this service may be obtained from the Circulation Section, Reference Division, Armed Forces Medical Library.

The period of loan for books and bound journals is two weeks from the date of receipt by the borrower, but may be extended for an additional two weeks on request. All books so loaned should be returned carefully wrapped in corrugated paper or stiff cardboard. If only a short article from a journal is needed, a microfilm or photoprint should be requested.

Reference Services. Reference librarians are available to help those who come to the Library. Questions which require minimal searching can be answered by telephone. In response to written requests, short lists of references, and more extensive bibliographic information on specific subjects can sometimes

be undertaken. Local resources should be exhausted before such requests are made. Requests should state:

1. The subject of a requested search, defined in considerable detail with delineation of any special aspects which are of particular interest.

2. The years to be covered by the search.

3. The languages to be included.

4. The sources already searched.

It should be remembered that it is helpful to the bibliographer to know in detail the purpose for which a bibliography is to be used.

The Library does not provide translating or abstracting services, but searches will be made for abstracts or translations already appearing in the literature when this is desired. Names of private abstracters and translators, who charge fees which must be paid by the person ordering the service, can be supplied on request.

Publications. The Library also issues a number of publications, the most important of which are:

1. *Current List of Medical Literature.* This is a monthly publication which lists the tables of contents of about 1,400 selected medical journals currently received. A subject and author index is included with each issue, and a semiannual cumulation of the indexes is also furnished. The *Current List* is distributed free on request to installations within the military establishment. Individuals may purchase subscriptions through the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at $13.50 a year ($17.00 for foreign subscriptions).

2. *Armed Forces Medical Library Catalog.* This is an annual publication containing the record of books and journals catalogued during the year, in two sections, author and subject. The Library deposits copies in certain major military medical installations. Additional copies are available from the Card Division, Library of Congress, Washington 25, D. C., at $17.50.

3. *Index-Catalogue of the Library of the Surgeon General's Office.* This has been a publication of the Armed Forces Medical Library since 1880. The last volume to appear was volume X of the fourth series, in 1948. Volume XI is soon to be published, and will be the last regular volume, although a supplementary series, closing out the work at the midcentury mark, is expected over the period of the next decade. Copies of the *Index-Catalogue* are deposited in all major military medical installations and in

many other libraries and research institutions throughout the world.

4. *Occasional bibliographies* of a comprehensive nature on subjects of current interest are published and distributed free on request to the Library. The most important recent titles are:

The Pituitary-Adrenocortical Function: ACTH, Cortisone and Related Compounds. 1950. 3,431 citations.

Plasma Substitutes; Except Those Derived From Human Blood, 1940-1951. An annotated bibliography. 1951. 888 references.

Bibliography of Military Psychiatry, 1947-1952; Literature Relating to U. S. Armed Forces With Selected References Relating to British Forces. 1953. 545 references.

Gas Gangrene and Gas Gangrene Organisms, 1940-1952. An annotated bibliography of the Russian Literature, 1940-1952, and the Non-Russian Literature for 1952. 1953. 324 references.

Bibliography of Military Medicine Relating to the Korean Conflict, 1950-1953. 1953. 110 references.

A comprehensive bibliography on the subject of bone physiology is scheduled for publication in the late fall of 1954.

5. The Armed Forces Medical Library *News*, a brief monthly review of the professional activities of the Library which is of particular interest to other medical librarians. The cost of printing the *News* is borne by the Friends of the Armed Forces Medical Library, a voluntary organization founded in 1952 following the dissolution of the Honorary Consultants to the Army Medical Library.

INFECTIOUS MONONUCLEOSIS

The etiology of infectious mononucleosis is still not established. Although it is generally regarded as a specific viral infection, there is no convincing evidence that this is the case. Many of the clinical and laboratory features suggest that it may be a disease of hypersensitivity, but this concept of its pathogenesis does not rest upon positive evidence. The reported occurrence of epidemics of the disease is evidence against such a concept. The possible role of an allergic reaction to bacterial infection deserves more attention.

—JOHN S. HUNT, M. D.
in *American Journal of the Medical Sciences*,
p. 95, July 1954

Toxic Organic Psychoses Due to Isoniazid Therapy

THEODORE A. KIERSCH, *Lieutenant Colonel, MC, USA*

WITH the use of isoniazid therapy for pulmonary tuberculosis, observations both in animals and humans have revealed signs of toxicity in the central and peripheral nervous systems. The reported cases to date, however, reveal evidences of a toxic psychosis in only a few patients in whom larger than usual doses of isoniazid were used.

Hunter[1] reported a case of acute toxic confusional psychosis in a patient who eight weeks later showed residual organic cerebral impairment of the Korsakoff type. His patient had received from 3.5 to 5 mg. of isoniazid per kilogram of body weight for three months and then the dosage was doubled for an additional month before she developed obvious toxic psychotic symptoms. This case was also somewhat complicated by the fact that the patient, emaciated and extremely ill with tuberculosis, had developed a microcytic hypochromic anemia. Eight weeks after therapy was discontinued she still showed evidence of organic cerebral impairment, clinically and by psychometric testing. Chu[2] reported one case of a toxic psychosis manifested by the usual signs of confusion plus delusions of persecution, ataxic gait, and slight tremor of the hands, following prolonged ingestion of from 700 to 950 mg. of isoniazid daily (from 10 to 14 mg. per kilogram of body weight). The psychosis apparently cleared three days after the drug was discontinued. After using isoniazid in 51 mentally ill patients with active tuberculosis, however, Krieser and associates[3] reported an opposite effect. Treatment with the drug resulted in an improvement in the mental behavior of psychotic patients; those with functional psychoses showed about 50 percent improvement.

The Committee on Therapy of the American Trudeau Society[4] reported that although toxic reactions occur, they are relatively minor in comparison with those due to streptomycin, dihydrostreptomycin, amithiozone, and viomycin. The Committee reported that various toxic reactions occur in about five percent of the patients receiving the drug, but in only one percent is the toxic reaction severe enough to contraindicate further treatment with

From Fitzsimons Army Hospital, Denver, Colo.

isoniazid. The average daily dose of from 150 to 300 mg., or even up to 600 mg. daily, was considered to cause no increase in the frequency of toxic reactions. The nervous system was most frequently involved, the commonest reactions being twitching of muscles, restlessness; and hyperreflexia. Other minor reactions were nervousness, apprehension, insomnia, and headache. More serious reactions were vertigo, syncope, convulsions, peripheral neuritis, major psychosis, and difficulty in micturition. Allergic reactions, and gastrointestinal, genitourinary, and hematopoietic system disturbances may also be sites of toxic manifestations. In 101 patients treated with iproniazid, Robitzek and associates[5] reported the occurrence, especially in older patients, of vertigo, muscle twitching, hyperreflexia, delay in micturition, mild euphoria, and headache. In 65 patients treated with isoniazid, similar side effects of lesser severity were reported; however, no cases of major psychosis were noted. Benson and associates[6] reported the toxic manifestations of these drugs, including central nervous system manifestations of apprehension and convulsions, and death due to respiratory failure, in mice, rats, rabbits, and dogs. Significant toxic effects were noted only when the drug was administered in amounts considerably greater than the therapeutic dose. These experiments also revealed that these agents were administered intrathecally in rabbits and dogs without them developing neurologic signs, which would indicate that these drugs do not have direct effect on the central nervous system. Rubin and associates[7] reported acute toxicity, characterized by excitement and convulsions, in mice and dogs; prolonged administration of the drug to dogs resulted in ataxia and tonic and clonic convulsions. They also concluded that the effects were reversible on the prompt withdrawal of the drug.

The following two patients were observed at about the same time at this hospital and under similar conditions. Both patients were treated with 300 mg. of isoniazid daily and both developed toxic organic psychoses which required their transfer to the neuropsychiatric department of this hospital for treatment. Interestingly, both patients were young, healthy Negroes with minimal tuberculosis. A review of the literature revealed that these two patients constitute perhaps the first reported cases of toxic organic psychosis due to isoniazid given in an amount usually considered normal and safe.

CASE REPORTS

Case 1. A 26-year-old man weighing 165 pounds was first admitted to this hospital on 28 July 1953 for observation for tuberculosis. Shortly after his admission many of the features of his past history were recognized as bizarre; examination revealed the patient to be obviously psychotic and he was trans-

ferred to the closed ward in the neuropsychiatry department. It was subsequently learned that he had been treated for tuberculosis at another hospital for three months and that he had gone AWOL on 7 July 1953 from that hospital. A review of his original history, as well as of information he furnished after his psychosis improved, indicated that he had been hospitalized the latter part of January 1953, and that a sputum culture had been positive for *Mycobacterium tuberculosis* in March 1953. Consequently he had been transferred to an Army treatment center for tuberculosis, where the diagnosis of minimal pulmonary tuberculosis was made and he was placed on intermittent doses of streptomycin and daily doses of 300 mg. of isoniazid. Serial roentgenograms showed some clearing of the pulmonary infiltration between April and June 1953.

His past history was not considered too reliable because of his marked tendency to confabulate; however, information from collateral sources indicated a fairly average past with no severe neuropathic traits. A search of his military hospitalization records revealed that prior to the diagnosis of his tuberculosis he had been hospitalized for "headaches and nervousness," associated with excessive alcohol intake and marital difficulties; however, no psychosis was evidenced. It was also known that this patient had recently used alcohol to excess on several occasions. On admission to this hospital, examination revealed a rather confused but oriented patient with flattened affect, a tendency to be circumstantial and concrete, and manifesting a great deal of confusion, especially regarding his recent past history. There was a delusional quality to many of his statements, and some ideas of reference were expressed. He admitted having had some auditory and visual hallucinations; however, he denied remembering their content. He had moderately hyperactive reflexes but no evidence of any focal neurologic lesion. Cerebrospinal fluid was normal. Psychologic testing revealed evidence of organic impairment without evidence of a purely functional psychosis. Two months later, after the patient showed marked psychiatric improvement, repeat psychologic testing revealed only minimal residual evidence of his former organic impairment, although he still showed a residual amnesia in connection with the events leading up to and during his unauthorized absence from the hospital. Under amobarbital sodium, although amnesia persisted, the patient recalled the circumstances leading up to his going AWOL from the other hospital. At that time, he had experienced symptoms of increasing tenseness, nervousness, headache, and insomnia, and was able to describe symptoms comparable to illusions, such as misinterpretation of shadows and normal noises occurring at night on the ward, when insomnia had kept him awake for about 48 hours prior to his unauthorized departure.

His subsequent conduct in this hospital was good, as it was in the previous hospital where he was undergoing isoniazid therapy. The patient was then given intermittent doses of streptomycin and daily doses of para-aminosalicylic acid, which he tolerated without difficulty.

Case 2. A 23-year-old man weighing 130 pounds was admitted directly to the neuropsychiatric department on 27 July 1953 with a transfer diagnosis of schizophrenic reaction, paranoid type. In March 1953 while stationed in Germany he noted the onset of a dry cough associated with some shortness of breath on exertion. By the latter part of April 1953 he was having night sweats and had lost 12 pounds in weight.

He was found to have a large pleural effusion with fluid level at the anterior end of the right third rib. He was immediately hospitalized and it was subsequently found that his sputum contained acid-fast bacilli. On 11 June 1953 he was started on 300 mg. of isoniazid daily and intermittent doses of streptomycin. The patient tolerated the drugs well until three days prior to his transfer to this hospital, when he became acutely anxious and very fearful that other patients on the ward were going to harm him. Later, after being placed in a private room, he became acutely disturbed, insisting he heard voices outside his door and saw faces outside his window which were going to harm him. He jumped out of his window and started to run away from the frightening voices and faces. He was apprehended and given a sedative, but the following morning he again appeared acutely apprehensive and obviously psychotic.

On arrival at this hospital the patient, although oriented, was extremely apprehensive, and readily admitted having many bizarre hallucinatory experiences, including a voice which told him he and the nurse were going to be hung in the morning and that attendants were plotting to shoot him. He was agitated and constantly carried a Bible in his hand. He asked the doctor to protect him and keep people from harming him. He interpreted relatively normal ward noises as proof of the fact that people were plotting to kill him. For several days this extreme agitation alternated with periods of excellent contact with reality during which he would readily admit the hallucinatory experiences that he had a few hours before, but could not explain them.

A review of this patient's past history revealed that his home environment was stable and he was well adjusted. His employers for whom he had worked for two consecutive years, stated that he was extremely well liked and adjusted, and that they were anxious for him to return to his former civilian job. The patient denied ever consuming a significant amount of alcohol, and this was confirmed by collateral sources.

A lumbar puncture done shortly after admission to this hospital revealed entirely normal spinal fluid pressure and findings. The patient showed no neurologic changes.

On admission to this hospital a toxic psychosis was recognized; all chemotherapeutic agents were discontinued and the patient was maintained only on intermittent minimal sedation. After his acute agitation disappeared, evidences of his toxic psychosis recurred over a period of about three weeks. A group of psychologic tests demonstrated evidences of severe organic impairment, including perseveration, generalized confusion, and severe memory deficit, without evidence of functional psychosis. His full scale IQ was 65.

During his six months' hospitalization in the neuropsychiatry department, the patient's conduct, behavior, and co-operativeness gradually improved; however, six months after his last dose of isoniazid, he still showed some of the classical residual features of an organic psychosis, such as labile inappropriate affect, impairment in concentration, and a moderate amount of confusion. No improvement occurred in his IQ; serious perceptual errors, signs of regression, disorientation, and perseveration still persist, and some signs are mildly indicative of schizophrenia.

With improvement of his toxic psychosis about a month after his admission to this hospital, because he still required chemotherapy for his tuberculosis, he was treated with intermittent doses of streptomycin and daily doses of para-aminosalicylic acid without evidence of recurrence of his overt psychotic manifestations. Serial roentgenograms of his chest showed a gradual clearing of the pleural exudate. He had no evidence of a parenchymal lesion.

DISCUSSION

Both these patients were treated with 300 mg. of isoniazid daily. Symptoms of an organic psychosis developed after three months of therapy in one patient and after seven weeks in the other patient. In the first patient there may be room for minimal doubt regarding the specificity of the organic factor; in spite of his past history of periodic alcoholism, however, a review of his hospitalization at the first hospital where he received streptomycin and isoniazid therapy revealed no evidence of his having obtained and consumed any alcohol. During subsequent observation at this hospital, there was no evidence of alcoholism. This patient clinically recovered from his psychotic episode and no deficit remained other than for his three weeks of amnesia. He still showed a tendency to fill in this amnesic gap with confabulation. Psychologic retesting, however, reveals minimal evidence of remaining organic impairment which, it is anticipated, will clear.

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The second patient had no emotional difficulty prior to his illness; his psychosis was of the classic toxic variety, leaving him with a significant degree of organic cerebral impairment which was evident both clinically and by psychologic testing. The fact that later psychologic test data revealed that he showed some mild schizophrenic features is believed to be of no consequence. It is well known that any organic psychosis, including those caused by brain tumors, may simulate schizophrenia. It is believed that this does not invalidate the assumption that this man's psychosis and evidence of brain damage were the result of isoniazid therapy. In these patients no other toxic factor was involved. Neither had received any significant amounts of barbiturates. Both were subsequently treated with streptomycin and para-aminosalicylic acid for over four months without any subsequent difficulty. When the isoniazid therapy was discontinued, both patients began to improve. The only logical conclusion is that isoniazid was the toxic factor. It is not desirable to expose these patients to further isoniazid therapy in an attempt to reproduce their organic psychosis under controlled conditions because both patients evidenced marked cerebral involvement with residual impairment in one. The danger of impairment to these two susceptible men far outweighs our scientific curiosity.

Over 1,000 patients with tuberculosis have been treated with 300 mg. of isoniazid daily at this hospital for variable periods of time (three months or longer) without a single case of toxic organic psychosis developing. A few of these patients have received up to 450 mg. of isoniazid daily.

SUMMARY AND CONCLUSIONS

Two young, relatively healthy Negro soldiers, while being treated with isoniazid for tuberculosis, developed symptoms of toxic psychosis with subsequent evidence of organic cerebral impairment. One made a good clinical recovery, while the other made only a fair clinical recovery, with evidence of severe residual cerebral impairment.

Toxic organic psychoses due to isoniazid used in normal therapeutic doses, although rare, do occur. The danger of permanent cerebral damage exists, and significant early signs of cerebral toxicity should be considered an indication for discontinuing isoniazid therapy immediately.

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THE COMMON COLD

The accumulation of scientific information regarding the agent or agents that cause the common cold has been exceedingly slow. Many questions and problems confronting investigators twenty years ago remain with them today. What are the mechanisms of transmission of the disease from host to host? Is there a carrier state? Does the virus remain in the tissues continuously in a manner similar to the herpes simplex virus and produce infection only when the resistance of the host is altered, or is each infection an expression of a new contact with the agent? Does an immunity develop after an attack of the disease? Is the cold caused by a single agent, or are there conditions? These are just a few of the questions. Although there has been much speculation about the answers, little experimental evidence has been advanced to support any of the ideas.

Virtually no advances were made in the methodology for studying the common cold during the time between the present day and the earliest investigation that proposed the concept of virus as the causative agent. Practical problems that were inherent in experimental studies undertaken by the early investigators also face the investigator of today. *There are no methods by which the virus may be studied in the laboratory, nor are there laboratory procedures that will establish the diagnosis of cold infection.* Because of this deficiency human beings must be the subjects of experiments, and this requirement severely limits the number and types of experiments that can be performed. This limitation, perhaps more than any other factor, is responsible for the slow accrual of information concerning the common cold.

—ROBERT S. GOHD, Ph. D.
in *New England Journal of Medicine*,
p. 687, Apr. 22, 1954

New Indication for Substitute Urinary Bladder

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THE unsatisfactory long-term results of ureterointestinal anastomoses, as well as the number of cases in which these anastomoses are impractical, have stimulated surgeons to seek ways of forming substitute bladders. One of the first efforts at formation of a substitute urinary bladder was made by Tizzoni and Foggi[1] in 1888. They used a segment of ileum with its blood supply intact, closed one end, and anastomosed the opposite end to the neck of the bladder. They later implanted the ureters into this ileal bladder.

Merricks and associates[2] in 1951 reported four cases in which the ascending colon was used as a bladder and the terminal ileum as a urethra. The ileocecal valve was used as a sphincter mechanism. Continuity of the gastrointestinal tract was established by ileocolostomy. In one case of this type the patient was alive and well 15 years after the operation.[2] Bricker and Eiseman[3] also reported on this type of substitute bladder. Rieger and Weisser[4] reported on a paraplegic in whom a substitute bladder was formed.

Peck and Newland[5] used the method described by Gilchrist and associates[6] in operating on five patients with infiltrative cancer of the bladder. Two of the patients had inoperable lesions and surgical intervention was performed purely as a palliative measure. Complete relief from bladder spasm, frequency, and burning resulted, however, and a full course of radiation therapy to the pelvis was possible. These patients catheterized themselves every four to six hours. Four months after the operation one of these two patients was lost to follow up and he died later, apparently from recurrence of his carcinoma. There was one operative death.

A new indication for a substitute bladder is presented in the following case.

From Walter Reed Army Hospital, Washington, D. C.

CASE REPORT

A 27-year-old white man received multiple injuries from grenade fragments and small-arms fire in North Korea on 26 July 1951. He had fractures of the pubic rami, large bowel perforation, right hemothorax, destruction of about three fourths of the bladder, and lacerations of the right testis, perineum, rectum, and anal sphincter. Details of immediate treatment are not available, but the first definitive procedures were instituted at a mobile army surgical hospital unit. Débridement, repair of the bladder and rectum, double barrel sigmoid colostomy, and supportive treatment were given. These procedures were very poorly tolerated and there was considerable bleeding from the bladder.

One week later the patient was evacuated to Japan where additional débridement was carried out. A right orchiectomy was done and a second attempt was made to repair the bladder and rectal defects, but, because of hemorrhage, only partial repair could be achieved. The following day, the right inferior vesical artery was ligated because of continued hemorrhage from the bladder. Minor surgical procedures were performed during the next few days and a third and unsuccessful attempt was made to close the bladder and rectal defects. The suprapubic cystostomy was ineffective for urinary drainage because of the vesicorectal fistula. The patient received a total of 39 pints of whole blood during the first two weeks following injury.

In January 1952, the patient was transferred to an army hospital in the zone of the interior where it was noted that he had multiple bladder calculi, right renal calculi, and bilateral pyelonephritis and had lost 50 pounds in weight. He was receiving large doses of morphine in an attempt to relieve the pain of his bladder spasms.

In February 1952, the vesicorectal sinus tract was excised and the defect closed, but this repair was unsuccessful. In May 1952, the vesicorectal fistula was repaired for the fifth time, but again without success. Urine escaped from the rectum freely because the rectal sphincter had been destroyed. This, together with the fact that the patient was bedridden, emaciated, incontinent of urine, and in continuous discomfort, presented many nursing problems. In August 1952, a calculus lodged in the lower third of the right ureter causing a complete block. A right ureterolithotomy was performed, but several more calculi were noted in the kidney. It was believed that little more could be done for the patient, but he requested transfer to Walter Reed Army Hospital for further treatment.

When seen at this hospital in March 1953, he was emaciated and in extreme discomfort due to bladder spasms and continued

leakage of urine from the rectum. A suprapubic cystostomy tube was in place but functioned poorly despite the use of a Stedman pump. The right testis was absent and, in addition to a large vesicorectal fistula, there was a fistula of the urethra at the penoscrotal junction. Urinalysis showed one plus albumin, many pus cells, and *Pseudomonas aeruginosa*. Roentgenograms of the pelvis showed metallic fragments over the right ileum, some deformity from the old fractures of the pubic rami, and moderate osteoporosis. An excretory urogram revealed bilateral renal calculi with moderate bilateral hydronephrosis and hydroureter on the right. The immediate management consisted of ambulating this bedridden patient. Intensive physiotherapy was begun and in two weeks the patient was able to walk with the aid of crutches. Three hundred units of hyaluronidase were given daily in an attempt to decrease the formation of renal calculi.

A cystoscopic examination showed multiple bladder calculi and a two-centimeter defect in the bladder neck which communicated with the rectum. In addition there was a one-centimeter sinus of the urethra at the penoscrotal junction. Litholapaxy of vesical calculi was done at this time.

In May 1953, a combined abdominoperineal Young-Stone type repair of the vesicorectal fistula was done. The patient remained in a prone position on a Stryker frame bed for two weeks in order to direct the urine through the suprapubic tube and allow proper healing of the operative area. Despite this effort, the vesicorectal fistula recurred at the end of two weeks. This was the sixth failure to close the fistula.

In June 1953, intestinal obstruction occurred and a laparotomy was performed which freed numerous small bowel adhesions. At this time an appendectomy and excision of Meckel's diverticulum were also done. Despite the repeated failures to close the fistula, the patient requested further attempts to effect some method of urinary control. If closure of the bladder defect and urethral fistula were successful, the patient would still be incontinent because of the destruction of the vesical sphincters, and the use of a penile clamp or a urinal bag would be necessary. Ureterosigmoidostomy was impractical because of the loss of the rectal sphincter. The proctology consultant believed that a rectal sphincter could be constructed to hold solid feces but it would never be capable of holding urine. The formation of a substitute bladder, as described by Gilchrist and associates, seemed to be the solution to this problem (fig. 1). On 12 August 1953, a substitute bladder was made using the ascending colon and terminal ileum. The bowel was prepared for two days prior to surgery using 7 grams of neomycin and 10.5 grams of phthalylsulfathiazole (sulfathalidine) in divided doses. The sur-

gical procedure was difficult because of tissue reaction from previous surgery. The right ureter was dilated to about two centimeters in diameter and was filled with purulent urine. A splinting ureteral catheter was used in the left ureter but not in the right. The anastomosis of the ureter to the bowel was the mucosa-to-mucosa type. The postoperative course was uneventful. A retention catheter in the substitute bladder provided continuous drainage. The wound healed primarily and the ureteral splint was removed on the fifth postoperative day.

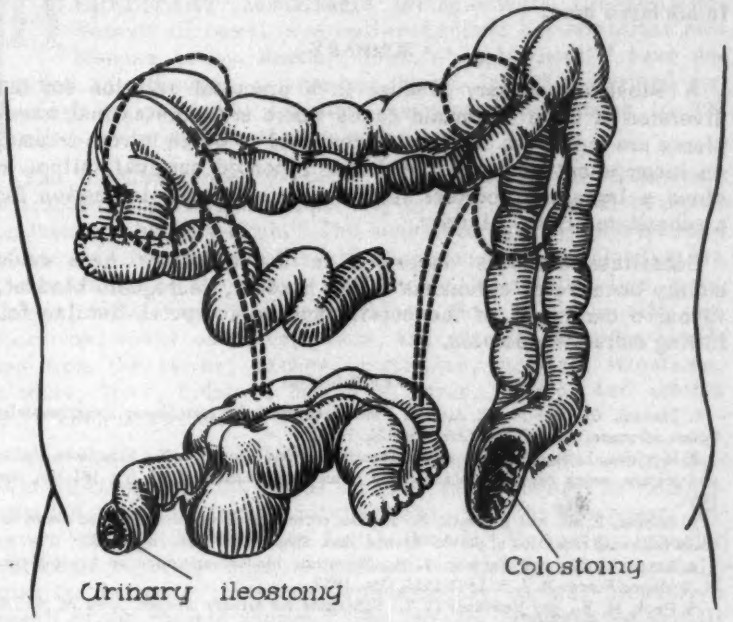

Figure 1. Showing bladder made from cecum and terminal ileum.

There was considerable epithelial debris and mucus during the first few weeks but this cleared as the "bladder" adjusted to its new role as a receptacle for urine. The patient irrigated the bladder daily with a bicarbonate solution. In September he had severe right renal colic and pyelonephritis. He spontaneously passed a calculus, measuring a half centimeter, which was recovered from the "bladder." In October a cystoscope was inserted into the substitute bladder but, because of peristaltic movements, visualization of detail was poor. The left ureteral orifice was patent and there was reflux up the left ureter. There were no reactions nor pyelonephritis following this procedure. The patient was ambulatory, comfortable, continent, and gained

weight daily. On 15 September his blood urea nitrogen was 33 milligrams per 100 cc., whereas on 2 November it was 20. Hemoglobin was 14.3 grams. Carbon dioxide was 25.6 mEq.; sodium, 144 mEq.; and potassium, 5.8 mEq. The bladder comfortably accommodated 10 ounces of urine and it is expected that the capacity will increase. The patient catheterizes himself every four to six hours and sleeps all night without leaking urine.

The patient was discharged from military service on 30 November 1953 to be followed by the Veterans Administration facility in his home area.

SUMMARY

A substitute urinary bladder is a practical solution for the diversion of urine in certain cases where ureterointestinal transplants are indicated. A case is presented in which severe trauma, an incompetent anal sphincter, and repeated surgical failure to close a large vesicorectal fistula created a new indication for a substitute urinary bladder.

Substitute bladders described in the literature were made mainly because of carcinoma of the bladder, neurogenic bladder, invasive carcinoma of the cervix, and vesicorectal fistulae following radiation necrosis.

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MODERN MEDICAL LITERATURE

The guess has been made that 5,000 (medical) periodicals published in a single year might represent about 11 million pages; if these pages were stacked one upon the other, the pile would tower 365 feet into the air and, if laid end to end, would reach 1,800 miles, from Chicago to Seattle. It may readily be seen what heights could be reached statistically with these figures.

—NATHAN FLAXMAN, M. D.
in *Journal of the American Medical Association*,
p. 1,410, Apr. 24, 1954

Rendu-Osler-Weber's Disease

Report of a Probable Case

RICHARD E. GREEN, *Captain, MC, USA*

HEREDITARY hemorrhagic telangiectasia (Rendu-Osler-Weber's disease) is a well-recognized but somewhat rare disease entity. Rendu,[1] Osler,[2,3] and others[4-6] have described the disease in various forms. In 1950, Garland and Anning[7] reviewed the literature and found references to 267 families suffering from this malady.

The disease tendency seems to be inherited as a dominant characteristic; but generations may be free from the disease, as emphasized by Fitz-Hugh.[10] The sexes are equally affected, and either may transmit the disease. Common sites of bleeding are the surfaces of the hands and fingers, nail beds, lips, ears, tongue, nasal septum, buccal mucosa, floor of the mouth, conjunctivas, scalp, eardrums, palate, and pharynx; however, bleeding from the larynx, trachea, esophagus, stomach, intestines, bladder, liver, kidneys, meninges, brain, spleen, and urethra have been described.[8,11,12]

The most common symptom is recurrent epistaxis arising from telangiectases of the nasal mucous membranes. The telangiectases are often noted in childhood, tend to disappear, and return during the third or fourth decade. Following repeated episodes of hemorrhage, a profound secondary anemia usually results. In some instances, splenomegaly occurs, probably a result of the chronic anemia.[13] The isolated hemorrhages usually cease, either with treatment or spontaneously. A few instances of exsanguination during bleeding episodes, however, are recorded in the literature. The over-all mortality rate is about four percent.[8] In a few cases, liver disease (cirrhosis, periportal fibrosis, fatty infiltration, venous congestion, and biliary dilitation) have been recorded.[12,14] Brandel[15] stated that the triad which must be fulfilled before the diagnosis of hereditary hemorrhagic telangiectasia can be made is: (1) inheritance, generally dominant, without sex linkage; (2) multiple telangiectases; and (3) recurrent hemorrhage from telangiectases. However, as emphasized by Fitz-Hugh[10] and Gambill,[11] inheritance, in an otherwise typical case, cannot always be proved.

From Letterman Army Hospital, San Francisco, Calif.

Schuster[16] and Bean[17] described the basic pathologic lesion. In essence, it is a thinning of the vessel wall, particularly the muscular coat, resulting in a bulging or ballooning of the wall at the site of the defect. Schuster reported that separate groups of dilated vessels are not permanent, but vary from time to time in number, size, and tendency to bleed; may even disappear completely. In 1930, Boston[18] reported three cases of this disease and noted that the blood examination (including bleeding time, clotting time, and platelet count) was normal except for secondary anemia in the three patients.

Telangiectases of the gastrointestinal tract have been reported on several occasions,[19] the first one being Osler's case.[3] Telangiectasia has been noted on sigmoidoscopic examination.[10, 20] Renshaw,[21] in 1939, was the first to report such findings noted at gastroscopy.

In many instances, hemorrhage from telangiectases occurs during childhood, but is usually of a mild form. During the third and fourth decades, hemorrhages recur, the telangiectases become more prominent and numerous, so that the severity of bleeding increases. Trauma of any form (such as blowing the nose) precipitates hemorrhages due to rupture of the endothelial lined vascular spaces. Spontaneous cessation of bleeding is generally the rule.[22]

Various forms of treatment, including electrolysis, roentgen rays, radium, micro-injection of sclerosing solutions, parenteral snake venom, vitamin P, rutin, blood transfusions, bland diet, and cauterization of local lesions, have been recommended from time to time. In general, treatment is not satisfactory. The use of rutin has been efficacious[9] in several cases of hemorrhage from gastrointestinal telangiectases.

It is our purpose to report a probable case of gastrointestinal telangiectases treated recently in this hospital because of massive gastrointestinal hemorrhage.

CASE REPORT

A 33-year-old, married woman was admitted to this hospital on 10 November 1953 as a transfer from a nearby U. S. Air Force hospital because of massive gastrointestinal hemorrhage.

The past history dated back to March 1948, when the patient first experienced massive melena. Because of recurrent massive melena requiring numerous blood transfusions, the patient was operated on in June 1948 at a civilian hospital. The operative report indicated that "the small intestine revealed marked varicosities." Gastrotomy, with exploration of the stomach and duo-

denum, had been unrevealing. No definitive operation was carried out.

Between June 1948 and November 1953, the patient was hospitalized on at least 24 separate occasions because of massive gastrointestinal hemorrhage manifested by marked melena, faintness, weakness, and anemia. At no time was there hematemesis. On all occasions the patient received from one to several blood transfusions and the gastrointestinal hemorrhage apparently ceased spontaneously. She was frequently treated for chronic secondary anemia with vitamin B_{12}, iron, folic acid, blood transfusions, and various assortments of vitamins. Likewise, she had repeated gastrointestinal barium studies, gastric analyses, proctoscopic and gastroscopic examinations, and blood studies, including bone marrow evaluations. These studies were repeatedly normal with the exception of the persistent chronic secondary anemia and evidence of pylorospasm on two separate upper gastrointestinal barium studies.

On 13 July 1953, the patient was hospitalized at a nearby service hospital because of massive gastrointestinal hemorrhage. During the following month, she received several blood transfusions and underwent numerous studies in an attempt to find the cause of the melena. On 21 August 1953, the patient was again operated on in an effort to determine the cause of hemorrhage. The following is taken from the operative chart: "Thorough exploration of all abdominal organs was carried out. The liver, spleen, duodenum, and gallbladder were normal. The stomach was opened through a longitudinal incision and the duodenum and stomach inspected. There was no evidence of either a recent or healed peptic ulcer and no polyps. The gastrostomy was closed. The entire bowel was carefully inspected from the ligament of Treitz downward, and extending the length of the jejunum and about one half of the ileum, large varicosities were seen, some running parallel to the bowel axis and others at right angles to it. About 15 feet of the small bowel were involved. No abnormality could be noted in the mesentery except for a few enlarged lymph nodes. The pressure in one of the large mesenteric veins was measured and found to be 18 cm. of water. The large bowel was normal." No definitive therapy was carried out. The patient was subsequently discharged from the hospital, but because of the recurrence of massive melena was readmitted and transferred to this hospital on 10 November 1953.

Past history indicated that as a child the patient experienced frequent episodes of "bloody diarrhea." These episodes continued until the patient was about five years old. There was no specific history of bleeding tendencies or hemorrhagic episodes in the patient's immediate family.

Physical examination at the time of admission to this hospital was normal except that the patient was very pale and complained of moderate weakness. She weighed 167 pounds and had a well-healed, long, right paramedian surgical scar. During her hospitalization, frequent episodes of massive melena occurred, requiring numerous blood transfusions. Repeated laboratory studies were normal with the exception of findings of a secondary anemia. Bleeding time, clotting time, platelet count, prothrombin time, prothrombin consumption time, reticulocyte counts, and red cell fragility test were normal. Upper gastrointestinal series, barium enemas, sigmoidoscopic, and gastroscopic examinations were likewise normal.

Because of the marked melena which required repeated blood transfusions, an abdominal exploration was performed for the third time on 9 December 1953. The appearance of the small intestine was very striking. The lumen was small in caliber. The mesentery was somewhat thickened, and at the base of the mesentery several large lymph nodes were encountered, one of which was removed. Throughout the small intestine, the luminal contents were dark and bloody. These areas of blood-filled intestine, about one foot in length, were intermittent in nature, occurring every several feet along the course of the bowel. The mesentery veins of the small bowel were prominent and seemingly enlarged, especially in the jejunal portion. Scattered intermittently throughout the entire small bowel, but again most marked in the jejunal portion, were numerous large, tortuous, dilated, engorged telangiectases, coursing mainly in a longitudinal direction over and along the entire mesenteric border of the bowel. Several of these veins were traced backward and were seen to come through the mesentery toward the bowel, and after reaching the mesenteric attachment of the bowel, would course subserously. Several of these veins coursed beneath the serosa for a variable distance and then disappeared, giving the impression they went into the mucosal layer of the bowel. The root of the mesentery was identified, opened, and the venous pressure of the superior mesenteric vein was measured to be 22 cm. of water. A typical section of jejunum, measuring about eight cm. in length was resected for pathologic study. No definitive surgical procedure was accomplished. The patient's postoperative course was satisfactory, and she was discharged on 19 December 1953, to be followed on an outpatient status.

The entire section of jejunum removed revealed numerous variable-sized and variable-shaped endothelial-lined and blood-engorged vascular spaces. The thinness of the endothelial lining was striking. These vascular spaces were single and in conglomerate groups, extending throughout the entire thickness of

the bowel wall, being most marked in the muscularis; however, a considerable number were encountered in the mucosal layer.

COMMENT

It is believed that this case represents an instance of Rendu-Osler-Weber's disease. Certainly, the history and clinical and pathologic findings are compatible with such a diagnosis. However, the hereditary aspects of the entity are not definite. It is almost certain that this patient will continue to have massive melena from time to time, and supportive therapy is all that is available to be offered in this case. Because of the marked telangiectatic involvement of the entire small intestine, complete resection of the small bowel did not seem feasible.

Although this is a rare cause of gastrointestinal hemorrhage, it should be considered in the differential diagnosis of gastrointestinal bleeding.

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PSYCHOTHERAPY IN HYPERTENSION

I think that psychotherapy is not indicated in the treatment of hypertension but it is indicated for most patients who have hypertension. To put it another way, high blood pressure in itself is not an indication for psychotherapy because I know of no evidence that the psyche is responsible for the disease hypertension or that psychotherapy can alter the course of hypertensive vascular disease. On the other hand, I feel quite certain that the symptoms attributed to hypertension frequently arise in a social setting of emotional stress, and that those symptoms are then frequently blamed upon hypertension, which is discovered in the course of the physical examination. Then so often, as you well know, we add to the problem of hypertension by the creation of a blood pressure phobia, and, of course, when that happens there is an indication for psychotherapy, and psychotherapy can remove and often does remove many of the symptoms that are attributed to hypertension.

Psychotherapy can be performed by the average physician and indeed it seems to me that in most cases it must be. Some of the profound personality disturbances in hypertensive patients do not yield to even prolonged psychotherapy and the patient in addition to his high blood pressure has the problem of long continued psychotherapy and the difficulties that often arise out of it to contend with. Of course, every case must be judged individually but in general I would urge that the average physician be prepared to treat his hypertensive patients for the symptoms which are of emotional origin and not confine himself to an effort to reduce the blood pressure.

—EDWARD WEISS, M. D.
in *Bulletin of the New York Academy of Medicine*
p. 378, May 1954

Corkscrew Esophagus

PAUL A. PADEN, *Colonel, MC, USA*

THE multiple irregular indentations, contractions, or dilatations of varying degree and constancy occasionally seen in the lower half of the barium-filled esophagus have been described by many terms, such as reflex spasm, spastic pseudodiverticula, segmental spasm, pseudodiverticulosis, functional diverticula, tertiary contractions, crinkling, curling, rippling, and corkscrew esophagus.[1-3] The phenomenon is little-known outside the field of roentgenology as there are usually no associated symptoms, though there may be dysphagia or chest pain.[1-3] If pronounced, the changes may persist for years.[4] Relationship of the milder, more transient form seen in elderly people, and frequently in cardiospasm, to the pronounced changes giving rise to a corkscrew appearance is not clear. The cause is unknown. Localized inflammatory changes in the esophagus arising from surrounding structures, reflex spasm from intra-abdominal or laryngeal disease, changes in the central nervous system, and neuromuscular imbalance have been advanced as causes. Reports of histological examination are very rare and have shown only slight fibrosis.[2,3,5] As no report of autopsy findings in a patient with pronounced changes has been found, the following case is presented.

CASE REPORT

A 41-year-old man suffered an anteroseptal myocardial infarction from which he promptly recovered, all abnormal electrocardiographic changes completely disappearing. Because of anginal-type pain, occurring only after retiring, he was examined for hiatus hernia. Pronounced corkscrew deformity confined to the distal third of the esophagus, and a small hiatus hernia were found (fig. 1). There was no obstruction to flow of the barium and no dysphagia. Convalescence continued until a fatal posterior myocardial infarction three weeks later.

Autopsy findings. At autopsy the expected changes in the heart and aorta were found. There was no herniation at a small esophageal hiatus. The esophagus was very mobile and possessed scarcely any fibrinous or muscular attachments. It was about five centimeters longer than usual and deviated to the right. The mucosa was intact and extended well into the cardia. There were

From Murphy Army Hospital, Waltham, Mass.

normal longitudinal rugose striations. The wall was not thickened and was free of scarring or other defects. Five sections taken from various levels and from the esophagogastric junction were

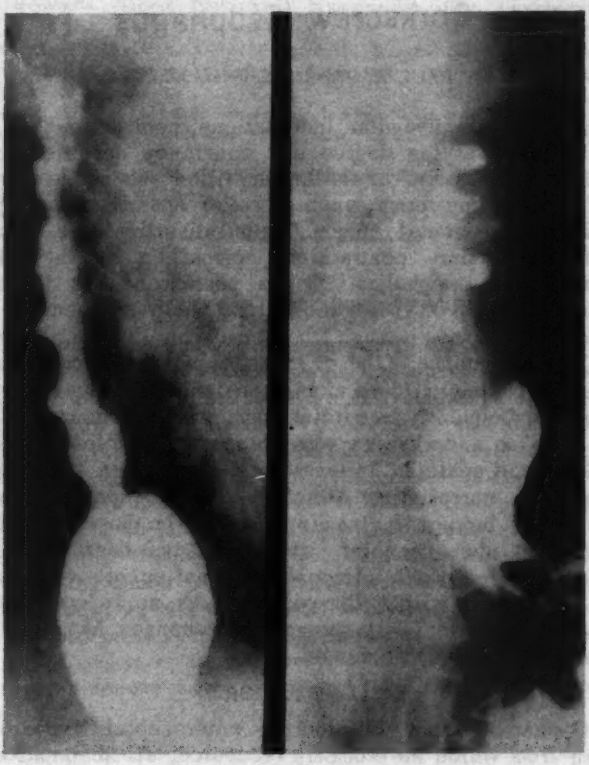

Figure 1. Note difference in appearance in oblique and straight projections, showing that the contractions do not involve the entire circumference of the esophagus.

studied microscopically (fig. 2). The mucous membrane was intact and not inflamed, the muscle fibers were normal, and there was no fibrosis. Elements of Auerbach's plexus were very conspicuous throughout, but no elements of Meissner's plexus were found.

DISCUSSION

Significance of the sparsity or absence of elements of Meissner's plexus and the apparent increase or hypertrophy of the elements of Auerbach's plexus is difficult to evaluate. Though both are normally present in the esophagus,[4] textbooks of his-

tology and surgical pathology make little or no comment concerning them. Inquiries from several pathologists have revealed that particular attention is usually not paid to them in this location. At best their function is not well understood and question as to whether or not they are a part of the autonomic system has been raised.[7] If they are, the changes are important, for Knight[8] has shown that functional activity of the esophagus is dependent

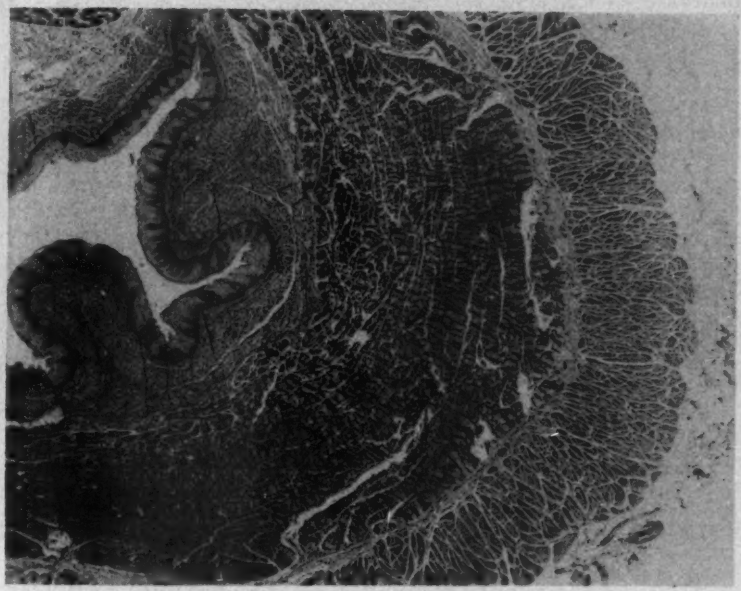

Figure 2. Photomicrograph of a section of the esophagus removed for biopsy. (× 12)

on its extrinsic nerve supply, the parasympathetic stimulating peristalsis and opening the sphincter, and the sympathetic causing inhibition of peristalsis and constriction of the sphincter. Until other similar cases have been studied, definite conclusions cannot be drawn. The changes do seem to support the neuromuscular imbalance theory. That the contractions only occur in that portion of the esophagus which has a dual nerve supply and can be markedly diminished or temporarily abolished by such drugs[1] as amyl nitrite, amphetamine (benzedrine), and atropine is additional evidence for the theory. Localized inflammatory changes suggested by Schatzki[9] as a cause when he proposed the term "Kräuselung" (Schatzki[10] does not consider "curling" a proper translation) were not present. As the changes occurred when cardiac disease was quiescent, reflex spasm does not seem a likely explanation. Johnstone[3] stated that there is always an

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associated hiatus hernia when the contractions are marked. He believed this occurs because uncontrolled contractions of the longitudinal muscles shorten the esophagus in a "concertina-like fashion." In life, that portion of the stomach into which esophageal mucosa extended was probably contained in the thorax, and caused the appearance shown in figure 1. Inability of the pathologist to demonstrate herniation is not considered significant, for disparity of findings in the area of the esophageal hiatus, during life and at autopsy, is well known.[11, 12]

SUMMARY

Absence or extreme sparsity of elements of Meissner's plexus, apparent increase or hypertrophy of the elements of Auerbach's plexus, and increased length of the organ were the striking postmortem findings in a patient with corkscrew deformity of the esophagus. No fibrosis and no adhesions were present. Significance of the changes cannot be stated conclusively, but they seem to support the theory that such contractions are due to neuromuscular imbalance.

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*Oak Leaf Cluster.

The names of officers of the medical services who have been awarded decorations by the United States Army, Navy, or Air Force are published in this department each month following receipt of information from official sources.—*Editor*

"ANGEL OF DIEN BIEN PHU" FETED BY CHIEF NURSES OF MILITARY SERVICES

Lieutenant Genevieve de Galard-Terraube, French heroine of Dien Bien Phu (second from right), is shown with the chief nurses of the three military services, Colonel Verena M. Zeller, USAF, left, Colonel Ruby F. Bryant, USA, and Captain Leona Jackson, USN, standing before the memorial to famed Red Cross Nurse Jane Delano during a reception at national headquarters of the American Red Cross during her recent visit to Washington, D. C.

REGULAR MEDICAL CORPS OFFICERS CERTIFIED BY SPECIALTY BOARDS

The American Board of Surgery

Second largest of the recognized specialty groups, the American Board of Surgery was activated in 1937. A total of 6,158 physicians had been certified by this board as of 30 June 1953, of whom 108 hold commissions in the regular services. They are:

Elmore M. Aronstam, *Maj., USA*
Curtis P. Artz, *Maj., USA*

Felix P. Ballenger, *Comdr., USN*
Lawrence L. Bean, *Capt., USN*
George L. Beatty, *Col., USA*
Luther G. Bell, *Capt., USN*
James J. Berger, *Maj., USA*
Philip A. Bergman, *Lt. Col., USA*
Ferdinand V. Berley, *Comdr., USN*
Harold F. Bertram, *Lt. Col., USA*
Herbert T. Berwald, *Col., USA*
John R. Bierley, *Comdr., USN*
Warner F. Bowers, *Col., USA*
Ralph E. Brown, Jr., *Maj., USA*
Robert B. Brown, *Capt., USN*

Ralph P. Campanale, *Maj., USAF*
Courtney G. Clegg, *Capt., USN*
Marion L. Connerley, *Comdr., USN*
Harold A. Conrad, *Col., USA*
Robert A. Cooper, *Capt., USN*
William S. Cornell, *Lt. Col., USA*
Philip A. Cox, *Maj., USAF*
Philip D. Cronemiller, *Lt. Comdr., USN*

John K. Davis, *Col., USA*
Harry L. Dein, *Lt. Col., USA*
Frank R. DeLuca, *Maj., USA*
Everett H. Dickinson, *Capt., USN*
Robert P. Dobbie, Jr., *Lt., USN*
Edward J. Doyle, *Lt. Col., USA*

Alan B. Baker, *Lt. Col., USA*
Shakeeb Ede, *Capt., USN*
David G. Eisner, *Lt., Col., USA*

Quentin J. Florence, *Comdr., USN*
James H. Forsee, *Col., USA*
Sanford W. French, III, *Col., USA*

Robert T. Gants, *Col., USA*
David Gold, *Col., USAF*
James E. Graham, *Col., USA*
Roald N. Grant, *Comdr., USN*
Garland A. Gray, *Capt., USN*
David D. Greene, *Capt., USN*
Herman A. Gross, *Capt., USN*

Frank E. Hagman, *Col., USA*
Joseph M. Hanner, *Capt., USN*
Robert M. Hardaway, III, *Lt. Col., USA*
Joe Harrell, *Col., USA*
Lewis L. Haynes, *Comdr., USN*
Thomas G. Hays, *Capt., USN*
Leonard D. Heaton, *Maj. Gen., USA*
Thomas H. Hewlett, *Lt. Col., USA*
Charles K. Holloway, Jr., *Lt. Comdr., USN*
James W. Humphreys, Jr., *Col., USAF*

Julian A. Jarman, *Col., USAF*
Marshall N. Jensen, *Col., USAF*
James P. Jernigan, *Lt. Col., USAF*

Robert J. Kamish, *Col., USA*
Douglas B. Kendrick, Jr., *Col., USA*
Paul V. Kiehl, *Lt. Col., USA*
James D. King, *Comdr., USN*

Douglas Lindsey, *Lt. Col., USA*
Edward S. Lowe, *Capt., USN*
Clinton S. Lyter, *Col., USA*

Walter H. Matuska, *Col., USA*
Philip J. McNamara, *Capt., USN*
Donald W. Miller, *Comdr., USN*

William W. Nichol, *Col., USA*
Emmett F. Norwood, *Comdr., USN*
Philip L. Nova, *Comdr., USN*

David P. Osborne, *Comdr., USN*

This is the twelfth of a series. The names of officers certified by the American Boards of Neurosurgery, Plastic Surgery, Proctology, and Thoracic Surgery will be published in the October issue.

BOARD OF SURGERY—Continued

Cannon A. Owen, *Lt. Col., USA*

Oakley K. Park, *Maj., USAF*
John S. Paul, *Lt. Col., USA*
George F. Peer, *Col., USA*
Lamont Pugh, *Rear Adm., USN*
Edwin J. Pulaski, *Lt. Col., USA*

Paul A. Reed, *Lt. Col., USA*
Robert L. Rhea, Jr., *Col., USA*
William M. Russell, *Capt., USN*

John M. Salyer, *Col., USA*
James B. Seaman, *Lt. Col., USA*
Sam F. Seeley, *Brig. Gen., USA*
Dan R. Sewell, *Col., USAF*
Joseph R. Shaeffer, *Col., USA*
Bernard D. Sherer, *Lt., USN*
Richard S. Silvis, *Capt., USN*
Edward G. Sion, *Col., USA*
Max L. Smith, *Lt. Col., USA*
Paul E. Spangler, *Capt., USN*
John H. Spillane, *Lt. Col., USA*

James H. Stewart, *Lt., USN*
Clifford F. Storey, *Capt., USN*
Victor C. Stratton, *Comdr., USN*

David E. Thomas, *Lt. Col., USA*
Herrick M. Thomas, *Maj., USAF*
Ralph G. Thomas, *Maj., USA*
Joseph J. Timmes, *Comdr., USN*
William A. Todd, Jr., *Col., USA*
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Frank H. VanWagoner, *Col., USA*

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John J. Wells, *Capt., USN*
Don S. Wenger, *Col., USAF*
Haskell M. Wertheimer, *Comdr., USN*
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Harold G. Young, *Capt., USN*

H. Haskell Ziperman, *Lt. Col., USA*
Joseph J. Zuska, *Capt., USN*

CORRESPONDENCE

(The following letter was recently received by Dr. Howard A. Rush, Chairman of the National Health Resources Advisory Committee, and is published with the writer's permission.—Editor)

Dear Doctor Rush:—The Board of Veterans Appeals is in need of medical officers to be added to its staff who are qualified or certified in the various specialties in medicine. It has been suggested that your good offices might be of assistance in identifying and advising medical officers who are leaving the armed services and who might be interested in full-time employment in Washington, D. C., with this Board. Our greatest need is for a cardiologist, a specialist in internal medicine, a neuropsychiatrist, as well as medical officers having competency in all other branches of medicine.

It will be greatly appreciated if the above information is brought to the attention of all competent medical officers who are leaving active service in order that they might get in touch with this office if interested.

R. L. JARNAGIN
Chairman, Board of Veterans Appeals
Veterans Administration, Washington 25, D. C.

A MESSAGE FROM THE A. M. A.

In view of its increasing importance to physicians in the military service and the publicity which has been given to legislation introduced during the present Congress, a brief review of the past and present policy of the American Medical Association with respect to the provision of medical care for dependents of members of the armed services is in order.

The House of Delegates of the American Medical Association, in December 1953, approved the provision of medical care for dependents of service personnel in military facilities and by physicians in uniform in overseas areas and in areas in the United States where civilian medical facilities and personnel are either unavailable or inadequate, but at the same time the House opposed the drafting of physicians to provide medical care for the dependents of service personnel in areas where civilian facilities are available.

The Board of Trustees, at its meeting on 15 February 1954, expressed the belief that medical care should be provided dependents of service personnel by: (1) military physicians in military facilities in overseas areas and in remote areas in the United States where civilian facilities are unavailable, and (2) civilian physicians in civilian facilities in all other situations.

The Board recommended further that the method of defraying the cost of the latter type of medical care should be through an additional allowance for military personnel with dependents which would permit the purchase of prepaid health insurance, such an additional cash allowance to be paid only in an allotment to an insurance company (nonprofit or commercial) if authorized by the serviceman. Finally, it was recommended that legislation be enacted authorizing payroll deductions to permit the payment of premiums for health insurance to the commercial or nonprofit insurance company designated by the serviceman.

In June of 1954, the Board of Trustees and the House of Delegates again reviewed the policy on dependent medical care. The Board at its meeting of 20 June 1954 recommended to the House of Delegates that "medical care should be made available for dependents of service personnel in the following manner: (1) By military physicians in military facilities in overseas

From the Council on National Emergency Medical Service of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense.—*Editor*

areas, other than United States territories or possessions, and in remote areas in the United States where civilian facilities are unavailable. (1) By civilian physicians in civilian facilities in all other situations." This position was approved by the House of Delegates on 23 June 1954.

GEN. OGLE NAMED USAF SURGEON GENERAL

Major General Dan C. Ogle, right, who was designated Surgeon General, U. S. Air Force, on 15 July 1954, is briefed on his new duties by General Nathan F. Twining, Air Force Chief of Staff. He succeeded Major General Harry G. Armstrong. Following his appointment as Deputy Surgeon General from December 1949 to March 1953, General Ogle was assigned as surgeon of U. S. Air Forces in Europe. During World War II he was surgeon of the 15th Air Force in Italy. He has served as surgeon of the Air University and is a graduate of the Air War College. Formerly the Air Force member of the House of Delegates of the American Medical Association, he is also a past vice president and fellow of the Aero Medical Association.

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AMERICAN PUBLIC HEALTH ASSOCIATION MEETING IN BUFFALO, 11-15 OCTOBER 1954

The American Public Health Association will hold its 82d annual meeting at the Statler Hotel in Buffalo, N. Y., 11-15 October 1954, under the presidency of Hugh R. Leavell, M. D., professor of public health practice at the Harvard School of Public Health.

Colonel Dwight M. Kuhns, MC, USA, chief consultant in pathology and allied sciences to the Surgeon General, is secretary of the laboratory section. Lieutenant Colonel Alvin F. Meyer, Jr., USAF (MSC), Offutt Air Force Base, Nebr., is chairman of the Committee on Industrial Sanitation and Captain Van C. Tipton (MC) USN, Bureau of Medicine and Surgery, Washington, D. C., is chairman of the Subcommittee on Radiological Health.

Speakers from the military services who are scheduled to appear on the scientific program include:

Epidemiological Investigations With Respiratory Disease Virus RI-67—Maurice R. Hilleman, Ph. D., Capt. Harry E. Dascomb, MC, USAR, Jacqueline E. Werner, M. S., Department of Virus and Rickettsial Diseases, Army Medical Service Graduate School, Washington, D. C.; First Lt. Richard L. Butler, MC, USAR, Fort Dix, N. J.; Capt. John J. McCue, MC, USAR, Fort Ord, Calif.; and Capt. Robert Stragnell, MC, USAR, Fort Leonard Wood, Mo.

The Evaluation of Serological Tests for Syphilis in Hansen's Disease—John F. Kent, Ph. D., Chief, Robert E. Harrigan, and A. Garcia Otero, M. D., Department of Serology, Army Medical Service Graduate School, Washington, D. C.

The Standardization of Diagnostic Methods for Gonorrheal Infections—Lt. Col. Paul S. Parrino, MC, USA, U. S. Army Hospital, Camp Kilmer, N. J.

Oral Penicillin Prophylaxis of Epidemic Streptococcal Infections—Comdr. John R. Seal (MC) USN, Head, Communicable Disease Control Section, Bureau of Medicine and Surgery, Department of the Navy, Washington, D. C.

Incidence of Serologic Types of Escherichia coli Associated with Infantile Diarrhea Among Pediatric Patients in the Denver Area—Maj. Charles D. Graber, Jr., MSC, USA, Bacteriology Section, Fitzsimons Army Hospital, Denver, Colo.

Studies on the Etiology of an Outbreak of Infantile Diarrhea—Lt. Col. Robert B. Lindberg, MSC, USA, Department of Bacteriology, Army Medical Service Graduate School, Washington, D. C.; Wilford D. Belknap, M. D., Fort Belvoir, Va.; and Joel Warren, Ph. D., Chief, Department of Bacteriology, Army Medical Service Graduate School, Washington, D. C.

Type Shifts in Shigella Flexneri During Epidemics—Lt. Col. Robert B. Lindberg, MSC, USA, Department of Bacteriology, Army Medical Service Graduate School, Washington, D. C.; and Kenvo Okabe, M. D., Chief, Chemical Division, Japanese Security Forces, Tokyo, Japan.

Antibody Responses of Man to Three Types of Antityphoid Immunizing Agents: Heat-Phenol Fluid Vaccine, Acetone-Dehydrated Vaccine, and Isolated Vi and O Antigens—Maurice Landy, Ph. D., Chief, Department of Bacterial Immunology, Maj. Sidney Gaines, MSC, USA, Immunology Division, Army Medical Service Graduate School, Washington, D. C.; Comdr. John R. Seal (MC) USN, Head, Communicable Disease Control Section, Bureau of Medicine and Surgery, Department of the Navy, Washington, D. C.; and Lt. James E. Whiteside (MC) USN, Navy Medical Research Unit No. 4, Great Lakes, Ill.

DEATHS

COTTINI, Frank Patrick, Chief Warrant Officer (HC) USN, 2d Medical Battalion, 2d Marine Division, Camp Lejeune, N. C.; entered the military service 12 February 1936, appointed a warrant pharmacist in 1943, promoted to chief warrant officer in 1945; died 6 July 1954, age 36, at Camp Lejeune, from a gunshot wound.

HARRIS, Eugene Perry, Captain (MC) USN, University of Pennsylvania Graduate School of Medicine, Philadelphia, Pa.; graduated in 1935 from the University of Texas School of Medicine, Galveston, Tex.; commissioned a lieutenant junior grade in 1937; died 30 July 1954, age 46, at the U. S. Naval Receiving Station, Washington, D. C.

HUTSON, William Everett, Commander (DC) USN, U. S. Naval Hospital, Oakland, Calif.; graduated in 1929 from St. Louis University School of Dentistry; appointed a reserve lieutenant, junior grade, in 1942 and commissioned a regular officer in 1949; died 9 July 1954, age 45, in Oakland, of hypertensive cardiovascular disease.

KELEMEN, Peter, First Lieutenant, MC, USAR, Medical Company, 7th Infantry Regiment, Korea; graduated in 1950 from the Harvard Medical School; appointed first lieutenant and ordered to active duty 13 May 1953; died 24 June 1954, age 27, from the results of a land mine explosion in Korea.

MEYERS, Claire Shull, Captain, ANC, USAR, Tripler Army Hospital, Hawaii; graduated in 1940 from University of Pennsylvania School of Nursing, Philadelphia, Pa.; entered the military service 15 July 1942; died 27 June 1954, age 50, in Hawaii, of anoxia.

SANDERSON, William David, Major, MC, USA, U. S. Army Hospital, Fort Campbell, Ky.; graduated in 1948 from Baylor University College of Medicine, Houston, Tex.; entered military service 16 January 1943; commissioned a first lieutenant 10 September 1948; died 2 July 1954, age 31, at Walter Reed Army Hospital, Washington, D. C., of myocardial infarction due to coronary occlusion.

TATE, Charles William, Lieutenant Colonel, VC, USA, Headquarters, Military District, Washington, D. C.; graduated in 1938 from the Texas Agricultural and Mechanical College School of Veterinary Medicine; entered the military service 19 August 1940; commissioned a lieutenant colonel 18 August 1953; died 15 June 1954, age 40, at Walter Reed Army Hospital, from injuries received in a fall.

BOOK REVIEWS

ELECTROCARDIOGRAPHY, by *E. Grey Dimond,* M. D. 261 pages; 272 illustrations. The C. V. Mosby Co., St. Louis, Mo., 1954. Price $14.

The author's preface states that this "book has been written solely for the general practitioner and the medical student with the intent of carrying such an audience from a totally uninitiated stage to a fairly sophisticated level." Toward this end, the volume represents a significant contribution. Beginning with the actual recording of an electrocardiogram, practical and reasonably detailed attention is given to problems of technic and the acceptable American Medical Association standards of direct-writer performance. Technicians and supervisors alike will profit from this section. A lucid discussion of the classical concepts of electrocardiography follows. With it are mingled those three-dimensional concepts of the vector loop and spatial vector-electrocardiography which clarify its understanding. To an unusual degree the book encompasses and integrates the various theories of interpretation. The last section applies these integrated principles to the diagnosis of heart disease. The reader is entertained and stimulated by the method of quoting in a final chapter the divergent and contradictory opinions of several authorities who define their criteria for the electrocardiographic diagnosis of left ventricular hypertrophy.

The format and illustrations are superior. The book will be of particular value to instructors and students of electrocardiography.

—*ROBERT B. DICKERSON, Lt. Col., MC, USA*

THE HISTORICAL ROOTS OF LEARNING THEORY, by *Horace B. English.* 21 pages; illustrated. Doubleday & Co., Inc., Garden City, N. Y., 1954. Price $0.65.

At last someone has reviewed the historical roots of contemporary learning theory in a manner that can hold the interest of the average student, whether or not he is studying educational psychology. It is refreshing to find a writer who does not feel compelled to expose this esoteric subject in all its formidable complexity, and who is able to simplify where simplification will help the reader grasp the point. The author's style is conversational and informal. The pamphlet reads as if someone had taken down verbatim a final review lecture in an elementary course in learning theory. The review touches upon French, English, and German contributions, and traces the development of learning theory chronologically. There is a brief interpretation of the contributions of the various schools of psychology to this subject. The author ends with an appeal for experimental programs in a field which he believes requires and justifies further exploration.

—*THEODORE C. KAHN, Maj., USAF (MSC)*

ACUTE RENAL FAILURE, by *Arthur Grollman*, Ph. D., M. D. 96 pages; 6 illustrations. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $4.

This short monograph attempts to "correlate and interpret" the extensive literature on acute renal failure in the light of the author's extensive clinical and physiological experience. Although the sections on pathogenesis and pathophysiology are frequently dogmatic, the concepts advanced serve apparently to give logical bases for therapeutic measures currently and generally accepted. The book is well-indexed, and the excellent bibliography contains 103 references arranged alphabetically.

The most serious complication of acute renal failure—severe potassium intoxication—should be given greater emphasis. Electrocardiograms illustrating this grave medical emergency are described but not pictured, and the therapeutic role of hypertonic sodium chloride as interim therapy in this situation is not described. Unfortunately this book appeared too early to include the experience of Meroney and Herndon in administering calcium salts for more prolonged management of potassium intoxication. During the oliguric stage hypopotassemia is rare, and the author's implication that it should be treated appears risky.

The opinions concerning the need for restoration of sodium and chloride concentrations and total deficits are controversial. Though the author subsequently uses correctly the total body water volume as a basis for calculating serum sodium concentration deficits, he introduces the subject in a way which is confusing and erroneous. Administration of hypertonic sodium chloride will expand the extracellular fluid by more than the volume administered.

The book may be especially valuable for its description of the technic in intermittent peritoneal lavage as developed in the author's laboratory. It is to be regretted however, that it does not contain a resumé of his clinical experience with the procedure, and a better evaluation of its usefulness in patients. Although little material is presented that is not available elsewhere in the literature, the monograph is recommended to the practicing physician as a compact summary of the subject.—*MARION E. McDOWELL, Maj., MC, USA*

HISTOLOGY, edited by *Roy O. Greep*, Ph. D. 953 pages; illustrated. The Blakiston Co., Inc., New York, N. Y., 1954. Price $15.

Modern technics of presentation have been used in this textbook of histology to emphasize not only basic morphology but also the relation of the individual components to the whole organism. Illustrations from the field of comparative anatomy; photographs by the electronic, phase, fluorescent, and polarizing methods; and the newer staining and histochemical technics were extensively employed in this thorough and substantial text.

In the early chapters the fundamental methods of study and handling of tissues, the development and use of various methods of microscopy, and, in detail, the function and structure of cells are presented. The blepharoplast of ependymal cells was the only element in the latter category not mentioned. The chapter on histochemistry was refreshing, though necessarily brief. Enough structural formulas were included to give the reader an insight into the scientific background of staining. From a consideration of individual tissues, the text then passes to the organ systems.

Descriptions and illustrations of stages of embryonic development give the reader an understanding of the derivation of tissue elements, and the fine description of placentation is an unexpected and welcome finding. The consideration of effects of physiologic activity on the histology of an organ such as the mammary gland, the relation of structure to disease exemplified by the discussion of the musculature in the wall of the bronchioles and its bearing on asthma, the minute consideration of the various layers and elements of the eyeball and contiguous structures, and the offering of both sides of controversial theories give finish and completeness to a splendid text.

No attempt has been made to substitute color for detailed illustrations and meticulous description. There are 648 illustrations, either photographs, drawings, or diagrams. The index is adequate and occupies 34 pages in small type; only paroöphoron was found missing. An extensive bibliography follows each chapter.

The authors are to be congratulated on a text well worth reading and owning by both beginning and advanced students of histology.

—*KENNETH F. ERNST, Col., MC, USA*

AMEBIASIS, by *Ernest Carroll Faust,* Ph. D. 168 pages; 30 illustrations. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $4.75.

The author states that "this short monograph is intended to provide a concise, comprehensive picture of amebiasis as a present-day clinical and public health problem." He accomplishes this in a delightfully clear and readable manner. The world-wide distribution of this disease, the frequent detection of "carriers," the means of spread of the parasite, and the failure of modern sanitation to reduce the incidence of the condition are stressed. Suggestions are given for possible means of control.

The clinical symptoms are briefly discussed, but the treatment is barely mentioned. The book is not suitable for the busy general practitioner to learn how to diagnose and treat the disease. It has little to offer the gastroenterologist. It provides a "bird's eye" view of all aspects of amebiasis but not much detail about any one phase. As an excellent general background for scientists interested in public health it is recommended for inclusion in all large medical libraries.

—*MAURICE C. DAVIDSON, Col., MC, USA*

TOXICITY OF INDUSTRIAL ORGANIC SOLVENTS, by *Ethel Browning*. 411 pages. Chemical Publishing Co., Inc., New York, N. Y., 1953. Price $8.

This book is a revision of a report, compiled by the author, and issued in 1937 by the British Medical Research Council, on the toxicity of volatile organic solvents which have widespread industrial use. It is a compend of up-to-date information gathered from the literature on the effects of 126 compounds on both animal and man to aid in the avoidance of poisoning from their use. Treatment of intoxication is also outlined, and there are two chapters devoted to hydrocarbons; one each to alcohols, ethers, esters, ketones, glycols and their derivatives, amines and coal tar bases, and nitrocompounds; and one chapter devoted to miscellaneous compounds, including carbon disulfide, acetic acid, acetic anhydride, cresols, dimethyl sulfate, and silicones and silane intermediates.

The material presented indicates that great care was used in the selection of the references and preparation of the data. It is well documented throughout, but no attempt is made to evaluate critically the data presented. Over 800 references are cited in the bibliographies covering the two chapters on the hydrocarbons. On the less commonly used solvents, the bibliographies are shorter. The author has called attention to the fact that many experiments have been made with little direct relation to conditions that might possibly occur in industry. In a number of instances, however, such sources provided the only data available and therefore were included, according to the author, partly for completeness and partly for such evidence as they afforded.

There is a well-prepared index. The physician concerned with maintaining the health of the worker in industry will find this book an especially useful reference on his bookshelf.—*ROBERT H. DUGUID, M. D.*

WINE AS FOOD AND MEDICINE, by *Salvatore P. Lucia*, M. D., Sc. D. 149 pages. The Blakiston Co., Inc., New York, N. Y., 1954. Price $3.

This is an authoritative treatise on wine, discussing the chemistry, physiologic effects on various systems of the body, the nutritive value, and the detailed indications for its use in specific medical conditions. The discussion of the chemistry, and especially the physiologic effects of various types of wines gives the physician information on the potentialities of wine as a therapeutic agent. In discussing nutritional value of wine, the author brings out interesting facts that are relatively little known and presents indications for its use in certain conditions. The final chapters discuss the administration of wine in various diseases, especially its use for the aged and convalescent patient.

This book not only provides enjoyable reading, but will greatly add to the physician's concept of the uses and values of wine not commonly considered heretofore, and as such should prove a good addition to his medical reference library. It contains an extensive bibliography.

—*DANIEL J. VALIGORA, Col., MC, USA*

PEDIATRIC PROBLEMS IN CLINICAL PRACTICE, by *H. Michal-Smith*, Ph. D., with 14 contributors. 310 pages. Grune & Stratton, Inc., New York, N. Y., 1954. Price $5.50.

In this book of thirteen compact, concise monographs by well-known authorities, the writers attempt in their own style to bridge the gap between usual medical treatment and complete therapy for the individual patient. The first two chapters on the normal child and the sick child serve as a general introduction and are particularly directed to social workers and teachers concerned with the health and welfare of children. The chapters continue, arranged in logical sequence, in fields such as the emotionally disturbed child, schizophrenic child, the mentally retarded child, and the brain injured child so frequently neglected in the hustle of a busy practice.

Each is written in a different, readable manner, with variable bibliographies at the end of each monograph. A chapter on the cerebral palsied child is the most compact treatise on this subject the reviewer has had the pleasure of reading. It not only emphasizes the basic purpose of this book but reviews the subject well for the pediatrician, psychologist, social worker, and teacher alike. A short chapter on the orthopedically handicapped child follows with an excellent outline of the rehabilitation program and the part each member of the medical team plays.

The last five chapters concern more specific problems of allergy, cardiac disease, diabetes, epilepsy, and tuberculosis in children.

This book would be particularly useful to teachers in the field of the "exceptional" child. It would serve to remind the physician to consider the child as a whole and to follow each child as a member of the medical team to that point from which the patient can be on his own and attain maximum productivity, physically, mentally, and emotionally in his particular environment.—*JOHN P. FAIRCHILD, Maj., MC, USA*

COUNSELING THEORY AND PRACTICE, by *Harold B. Pepinsky* and *Pauline Nichols Pepinsky*. 307 pages. The Ronald Press Co., New York, N. Y., 1954. Price $4.50.

The authors establish their objectives in the preface by indicating that "the professional counselor all too often has the notion that his basic training in theoretical and experimental psychology is quite independent of the work in his chosen specialty." To orient both the prospective and actual practitioner (whether or not he is to be designated as a "counselor" or as a "psychotherapist"), the first three chapters are devoted to such topics as the dual role of the counselor (practitioner and scientist), the necessity for formulating in more readily testable form behavioral changes which occur during treatment, and a resumé of the current major theoretic frameworks of reference, including brief summaries of their historical roots. The remainder of the text represents what the authors concede to be a preliminary systematic conceptualization of a viewpoint most closely related to what

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they have earlier termed the "neobehavioral" viewpoint, expanded, however, to include behavioral phenomena apparently most frequently encountered in the college level guidance or counseling centers.

Although this reviewer is impressed with the detailed, scholarly approach maintained throughout, he is beset with the problem of "too little" and "too much" being said in some instances. For example, one who has had limited prior contact with comparative behavior theory would gain little from the over-simplified and limited coverage of the five "major approaches" to counseling. On the other hand, a person already reasonably competent in neobehavioral concepts would be apt to believe that the earlier chapters are "wasted," and might desire more than is given at the practices or technic levels of counseling. At the practices level, there appears to be an assumption that client problems are almost exclusively of a relatively simple or not-too-complex nature.

Despite these criticisms, the book is recommended to those who are looking for guidance in the formulation of theoretic "models" in communicable and testable forms and/or those interested in a pioneer attempt to expand a learning viewpoint of considerable prominence as well as to those about to begin their training in the counseling process.

—JAMES W. LAYMAN, Maj., MSC, USA

THE HEPATIC CIRCULATION AND PORTAL HYPERTENSION, by *Charles G. Child*, III, M. D. 444 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $12.

A physician confronted by a patient with portal hypertension, ascites, esophageal varices or esophagogastric hemorrhage may easily orient himself by studying the excellent diagrams, graphs, reproductions, case abstracts, and discussion of medical as well as surgical therapy presented in this book. Mercurial diuretics, low-salt diets, cation exchange resins, serum albumin, and the use of endocrine products are presented in a practical manner. The role of the liver in shock and the effect of hepatic disease are vividly explained.

Percutaneous splenic puncture with portal venography and operative manometry and venography are described and well illustrated. The effects of hepatic arterial and/or portal venous exclusion are summarized. An intriguing suggestion is arterialization of the portal vein by means of a vein graft between the aorta and hepatic end of the portal vein in conjunction with an end-to-side Eck fistula. Procedures not involving production of shunts are likewise amply illustrated. Very illuminating are the corollaries of pathologic finding, exploits of experimental operations, and case descriptions.

General practitioners, internists, gastroenterologists, and general surgeons will find this an outstanding and valuable book.

—JAMES B. SEAMAN, Lt. Col., MC, USA

FRENCH'S INDEX OF DIFFERENTIAL DIAGNOSIS, edited by *Arthur H. Douthwaite*, M. D. 7th edition. 1,046 pages; with 731 illustrations, of which 200 are in color. The Williams and Wilkins Co., Baltimore, Md., 1954. Price $20.

This volume is a treatise on the application of differential diagnosis to the principal signs and symptoms of disease. It covers the field of medicine, surgery, gynecology, ophthalmology, dermatology, and neurology. This new edition, after a lapse of 10 years, is completely revised without excessive repetition or overlapping.

Signs and symptoms are presented in alphabetical sequence as in previous editions. Common, less common, and rare conditions are discussed. Throughout the text an effort is made to correlate pathologic lesions and pathologic physiology with the clinical manifestations. Newer diagnostic tests and procedures are presented and obsolete material deleted. Treatment is discussed only when it serves in establishing a diagnosis. The articles are clear, brief, and to the point.

In an effort to maintain a single volume work, type has been reduced in size and this may be found objectionable to some readers. The index is complete and comprehensive, covering 150 pages. It gathers symptoms under the headings of the various diseases in which they occur. The number of illustrations has been increased and about one third are in color. Color plates have been improved, especially those depicting dermatologic and hematologic conditions. Roentgenographic diagnosis by special methods is incorporated under appropriate sections throughout the text. The plates are clear and easily read.

This volume maintains the standards of excellence achieved by previous editions and is recommended as a reference medium for the medical student, the general practitioner, and the specialist in their daily work.—*WILLIAM STEIN, Lt. Col., MC, USA*

FIRST AID AND RESUSCITATION, by *Carl B. Young, Jr.*, M. P. H. 335 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $8.50.

The purpose of this manual is the conservation of human life. To this purpose the author has devoted 35 well-written chapters; each concerning the management of some particular type of emergency. Written primarily for rescue squads, firemen, policemen, ambulance crews, interns, and industrial nurses, this is the best manual dealing with this vital aspect of medicine that the reviewer has ever had the opportunity to read. It is of equal importance to the practicing physician, judging from many patients seen in the receiving offices and wards of the average hospital who had been treated at the scene of the accident or emergency and had not in all instances received the proper or essential first-aid care.

The subject matter is briefly, clearly, and interestingly presented. Only elemental physiologic explanations have been used; these are,

however, so clearly stated that they can be readily understood by those who have had no training in medicine or related fields. Chapter 6, consisting of 48 pages, which concerns the transportation of the seriously ill or badly injured patient, should be required reading for every ambulance driver and crew. This valuable book should be made available to every group interested in the field of first aid and resuscitation work.—*JAMES E. GRAHAM, Col., MC, USA*

NARCOTICS AND NARCOTIC ADDICTION, by *David W. Maurer*, Ph. D., and *Victor H. Vogel*, M. D. 303 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $7.50.

This is a practical manual on narcotic addiction for professional workers such as government officials, law enforcement officers (including the police, narcotics and customs agents, probation officers, social and welfare workers, prison and reformatory officials), attorneys, criminologists, the clergy, and writers. The book is not sufficiently comprehensive for use as a text for psychiatrists or toxicologists. Probably the most complete and thorough book yet published on a subject about which folklore is more common than fact, it should be of interest to physicians who desire a general knowledge of narcotics and narcotic addiction. It is not a sensational book, but is carefully written, meticulously phrased and qualified in the fields where the authors recognize that factual material is thin.

Methods of drug administration used by addicts, because these technics differ markedly from standard medical procedures, are cited. There are special chapters on the treatment of patients with drug addiction, and on the argot of narcotic addicts. The various drugs and their physiologic and psychologic effects on those who are addicts are described.

Much of the information in the book came from studies made at the U. S. Public Health Service hospitals in Lexington, Ky., and Fort Worth, Tex. Controversial and debatable material has been admitted and should be extremely useful for the people for whose use it has been prepared.——*WALTER R. deFOREST, Lt. Col., MC, USA*

LOW BACK PAIN AND SCIATICA, by *Louis T. Palumbo*, M. D. 35 illustrations; 104 pages. J. B. Lippincott Co., Philadelphia, Pa., 1954. Price $3.

In the author's opinion low back pain, with or without sciatica, is increasing percentagewise as our industrialization broadens and transportation methods expand. He emphasized that important changes in our concepts of the causes and treatment of this condition have changed during the past 10 years. The diagnosis of sacroiliac sprain, lumbago, fibrositis and fasciitis, have, generally, given way to the conception that most of these patients are suffering from traumatic and/or degenerative changes in the intervertebral disks secondary to aging and to chronic minor trauma. The newer anatomic and physiologic concepts of low back pain, in turn, have led to improved requisites for conservative and surgical management.

A review of basic anatomic considerations and etiologic factors is followed by a detailed section on diagnosis. Intervertebral disk disorder is discussed in a special section, and the studies indicated to prove or disprove the diagnosis follow. Conservative treatment is stressed because, in the author's experience, therapy is limited to nonoperative conservative measures in about 90 percent of the cases. Finally, there is a section on surgical treatment for the patients who fail on positive conservative treatment and/or in whom a definite congenital or acquired symptomatic lesion has been diagnosed. A bibliography of 122 references and an index are included.

This monograph is well written, clear, and easy to understand. It is highly recommended for all those interested in the problem of low back pain and who must constantly apply their clinical acumen to the management of this condition.—*EDWIN J. PULASKI, Lt. Col., MC, USA*

FUNDAMENTALS OF NEUROPATHOLOGY, by *William Brooks Dublin*, M. D. 685 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $18.50.

This volume has been prepared with the purpose of presenting the pathology of the nervous system from the point of view of the general pathologist and in the language he is accustomed to use. In this effort the author has succeeded because he stresses the general similarities of the lesions occurring in nervous tissue to those in other regions of the body. The book is readable and its concepts are clearly stated. Wherever possible, lesions of the nervous system are discussed from the viewpoint of their cause or point of origin. The entire field of neuropathology, including related lesions or lesions with nervous system manifestations, is covered systematically along with chapters on methods of examination and normal and pathologic histologic findings. Clinical manifestations are considered only briefly in relationship to pathologic changes. The discussions are concise and the language often terse.

The information is, for the most part, authoritative and accurate. I would not agree, as he states, that sarcoidosis is noncaseating tuberculosis. The classification and terminology applied to tumors differs widely from common usage and, were it not for the inclusion of better-known terms, the reader might have difficulty in following the text. Neoplasms are discussed from viewpoint of cell origin, generally beginning with the most primitive type and working up to the most differentiated. The interrelationships between different tumors are thus clearly outlined.

The book is profusely illustrated with excellent black and white photographs. Three color photographs, however, leave something to be desired. There is an excellent bibliography of 496 references and the index is adequate. The volume is a fine contribution to medical literature and will be useful to anyone interested in the pathology of the nervous system.—*HOWARD A. VAN AUKEN, Col., MC, USA*

THE BIOCHEMISTRY OF CLINICAL MEDICINE, by *William S. Hoffman*, Ph. D., M. D. 681 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1954. Price $12.

This book is offered with the purpose of orienting the general practitioner in clinical biochemistry and providing a review in basic science for physicians studying for various American specialty boards.

The author states that his approach is entirely didactic and because of this the bibliography furnished is limited. He believes it is possible to accomplish his objectives without using highly technical explanations and organic chemical formulas. While this is obviously a large order, a sincere and, for the most part, successful treatment has been given to the material presented. Correlation of the laboratory and clinical findings in a large number of conditions, including diabetes, water and electrolyte balance, kidney disease, liver disease, and malfunction of glands of internal secretion, as well as protein, carbohydrate, and lipid metabolism are discussed. Complete coverage of all these subjects from a clinical as well as biochemical aspect is impossible within such a short space, and the author necessarily makes some rather broad statements which may be disputed by many.

As a good starting point for orientation of the general practitioners and board aspirants, however, this volume serves a definite purpose and can be read with profit. The illustrations are simple and understandable. The style is good, although in the attempt to condense the material, the writer becomes a little obscure at times. This book is recommended as a good orientation and review in the less complex aspects of biochemistry as they relate to clinical medicine.

—*ROBERT S. NELSON, Col., MC, USA*

PRINCIPLES OF VETERINARY SCIENCE, by *Frederick Brown Hadley*, D. V. M. 5th edition. 546 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $5.25.

This book is intended for agricultural students and for practical livestockmen. It is not designed for professional veterinary students. The author attempts to draw a distinction between veterinary science and veterinary medicine. In this, the implication is made that the essential difference is a matter of legalization of collection of fees for services rendered by the veterinarian.

The book is divided into two parts: (1) anatomy and physiology, and (2) diseases. These encyclopedic parts are divided into 27 chapters and are characterized by superficial treatment of the subject matter and frequent errors of omission and commission. Included in the author's definition of "manual handicrafts" are castration of cryptorchids, ovariotomy, and "correcting of dystocia." The reviewer believes that this book serves no useful purpose and is a source of dubious advice and misinformation.—*WILLIAM S. GOCHENOUR, Jr., Lt. Col., VC, USA*

PNEUMONIA, by *Hobart A. Reimann*, M. D. 236 pages; 19 illustrations. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $5.75.

This monograph on pneumonia by one who has contributed signally to our knowledge of the subject is a clear, readable resumé of the incidence, causes, and treatment of all forms of this disease.

While there is not much that is really new in this treatise, it serves to emphasize, especially in the first chapter dealing with incidence, that the total number of cases has not been materially lessened by the newer forms of treatment. It also impresses on the reader that there are a great number of causes of pneumonia and that not every instance of clinical pneumonia, as revealed by percussion, the stethoscope, or roentgenogram, will yield to that particular "wonder" drug currently favored by the clinician. The book, therefore, indicates that it behooves us to take a renewed interest in causes, more specific treatment, and pneumonia in general. The fact that the eighth edition of Cecil's *Textbook of Medicine* devotes only 28 pages to pneumonia, whereas the seventh edition devoted 38 pages to the same subject, is an indication of the lessening importance attached to pneumonia by the profession.

Dr. Reimann's monograph should serve to stimulate the reader to more accurate clinical appraisal of cases of pneumonia coming under his care. Because in most cases the more specific forms of therapy currently available quickly render the sputum free of the offending bacteria, it should also stimulate more thought along the lines of prophylaxis of a disease which, despite this chemotherapeutic triumph, still is practically as prevalent as before.

The author discusses each of the many forms of pneumonia from pneumococcic pneumonia to pulmonary involvement in diseases of the collagen system, giving the incidence, causes, pathology, clinical symptoms, diagnosis, prognosis, prevention, and treatment of each form in which these factors are pertinent.

—*HUBERT H. CARROLL, Capt. (MC) USN*

INTENSIVE GROUP PSYCHOTHERAPY, by *George R. Bach*, Ph. D. 446 pages. The Ronald Press Company, New York, N. Y., 1954.

This book describes both theory and practice of group psychotherapy. The first section of the book is concerned with clinical technics of selection and guidance of group members as well as with how the therapist regulates himself in relation to the group. This section is useful as a training manual for clinical operations, particularly if it is combined with actual experience and supervision. The author's attempt to delineate "do's" and "don'ts" for the therapist in the group therapy situation is sufficiently general for good clinical practice in any therapeutic situation, and is well documented with case protocols.

The other two sections of the book describe the therapeutic affects of group therapy and the factor of group dynamics in the therapeutic

process. The presentation of an eclectic theoretic framework for group therapy is admirable but sometimes ambiguous. The various concepts of field theory, Freudian and Sullivanian psychoanalysis, learning theory, and group dynamics are difficult for the reader to correlate until the author presents the clarifying concept of "theragnosis." This concept explains the effects and processes of group therapy as a contact operation. The author draws heavily from his experience with Lewin's principles and concepts of field theory and group dynamics.

This book is a noteworthy contribution to the field of group psychotherapy and would best serve as a primer for those learning this technic.

—*JACK WERBOFF, First Lt., USAF (MSC)*

HEADACHE, Diagnosis and Treatment, by *Robert E. Ryan,* M. D. 338 pages; illustrated. The C. V. Mosby Co., St. Louis, Mo., 1954. Price $6.50.

Headache is a complaint daily related to the physician. The author has lucidly presented an evaluation of this common condition as a symptom of disease, seen in all branches of medicine. This readable text approaches the subject by discussing the causes, symptomatology, and treatment, with case histories as examples, and gives a brief outline summary of each chapter. A bibliography is included at the end of most chapters. Headache may be the primary or a secondary complaint in the patient's disease. Reference to this text will direct attention to the causative factors of headache and assist in the diagnosis of the patient's condition and his therapy.

The excellent typography and detailed outlining materially add to the effectiveness of this volume as a detailed reference. It is recommended for both the general practitioner and the specialist who desire to do something for the patients with headaches who consult them daily.

—*EDWARD J. WHITELEY, Lt. Col., MC, USA*

HISTOPATHOLOGY OF THE SKIN, by *Walter F. Lever,* M. D. 2d edition. 518 pages; 281 illustrations with 8 in color. J. B. Lippincott Co., Philadelphia, Pa., 1954. Price $12.

Since the publication of the first edition in 1949, this text has become an established guide for the graduate student in dermatology and a valuable reference for the general pathologist. The revised second edition contains an additional 69 pages, 60 new illustrations, and 56 new photomicrographs. Various sections have been rewritten and a chapter has been added. The noninfectious vesicular and bullous diseases have been grouped within a new chapter of 29 pages which reflect, in a precise manner, the present concept of the histopathology of these diseases. The bibliography for this chapter has been carefully selected; over half of the references have appeared in the literature within the past five years.

The chapter on pigmented nevi and malignant melanoma has been expanded, revised, and rearranged. The author has clearly defined the present concept of the histogenesis of the nevus cell: "Whereas, in the past, the melanin-producing dendritic or clear cells were considered

to be modified basal cells, there is now almost complete agreement that they are neural cells which originate in the neural crest and migrate from there with the nerves to the epidermis during early fetal life. The great majority of investigators have accepted the theory, first proposed by Masson in 1926, that both the melanocytes in the epidermis, the so-called clear cells, and the nevus cells are of neural origin."

New sections covering the following have been added to the second edition: hibernoma, hemangiopericytoma, beryllium granuloma, papular myxedema, prophyria, and ochronosis. The author must be congratulated for improving an already outstanding text.

—*CALVIN B. GALLOWAY, Capt. (MC) USN*

DISORDERS OF THE BLOOD, by *Sir Lionel E. H. Whitby*, M. D., and *C. J. C. Britton*, M. D., D. P. H. 7th edition. 856 pages; with 20 plates and 106 text-figures. Grune & Stratton, Inc., New York, N. Y., 1953. Price $9.50.

The authors have succeeded admirably in the tremendous task of preparing a new edition of their standard textbook. We are living in an era of vast interest in hematology, as reflected both in the wealth of medical literature on the subject and in the number of international societies. Now that coagulation and immunohematology have come into their own, they are considered specialist fields.

The revision of a textbook of hematology requires the assiduous selection of bibliographical material with reconsideration of the references used in the previous text. This was but one of the factors that confronted the authors. The subject material has been brought up to date, as of the middle of 1953. There is a new chapter on biochemistry and cytochemistry of hemopoiesis. New and informative material has been added and much revision has been done in the chapters discussing hemopoietic metabolism, therapeutics coagulation, and the purpuric and hemorrhagic diseases. The additions of immunohematology and of a discussion of the treatment of incompatible transfusions enhance the value of the chapter dealing with blood groups, hemagglutinations, and blood transfusion.

The volume contains a number of new illustrations; eight new plates on art paper and 12 new text figures. Additional illustrations would be welcome. The book has been enlarged by 87 pages, mostly expounding new technics. The plates that appear in color, as in the previous revision, are excellent.

This volume is an outstanding contribution to medical literature. It is especially recommended as a reference work for the hematologist, as well as for the student in the field. The medical internist will find it particularly useful because of the extensive bibliography of the international literature at the end of each chapter.

—*GIOCONDA R. SARANIERO, Lt. Comdr. (MC) USN*

EAT, THINK AND BE SLENDER, by *Leonid Kotkin*, M. D., with the assistance of *Fred Kerner*. 223 pages. Hawthorn Books, Inc., New York, N. Y., 1954. Price $2.95.

This book was written to help obese patients gain the insight necessary to combat their problem. The central theme of the book is that obesity is caused primarily by an abnormal psychologic attitude manifested by overeating. This point is made clear by repetition. The author rules out any metabolic and glandular causes in which many nonmedical readers might believe. He presents a plan of reducing weight with a diet high in protein, and low in fat and carbohydrate. Simple menus are included showing how such a diet may be appealing and easy to prepare, and can be bought in restaurants. The discussion of metabolism is oversimplified. The need for medical counselling is stressed and the role of following the physician's advice in the case of anorexients. For refractory patients psychoanalysis is advised.

The book may help some of its readers; it may antagonize others who resent the obvious deductions to be made concerning their abnormal psychologic outlook. These latter persons may become even more fixed and refractory. Written for the layman, the book is easily read. The reviewer doubts if it will make any great progress in solving the very serious problem of obesity.

—*WILLIAM M. WEBB, Lt. Col., MC, USA*

MAYO CLINIC DIET MANUAL, by The Committee on Dietetics of the Mayo Clinic. 2d edition. 247 pages. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $5.50.

This manual is a revised edition of an earlier one published by the dieticians of several hospitals of the Mayo Clinic and approved by the heads of the various departments. The diets are listed as to content of proteins, carbohydrates, and fat as well as minerals and vitamins. Any deficiencies that may be present are noted. A breakdown of types of food separates those items that may be included in the diet from those that should be excluded. Sample menus, including a column of approximate measures, are helpful in explaining diets to patients. This is a step in the right direction, but an even better method is the use of a table of equivalents which is easier for the patient to use. The aim of this book, however, is to be concentrated, concise, and complete enough for use by dieticians and physicians.

The manual gives listings of all regular and special diets likely to be used today in a hospital, with some excellent diets for surgical patients. It will quickly show the physician what his patient actually receives on a special diet, and helps avoid the evil of a unique diet for each patient.

The volume on military service hospital diets is a similar publication but because it is scarce and out-dated, a volume such as this manual should be of great value to dieticians and physicians on active duty.

—*JAMES L. TOBIN, Col.,, USAF (MC)*

THE YEAR BOOK OF ORTHOPEDICS AND TRAUMATIC SURGERY (1953-1954 Year Book Series), edited by *Edward L. Compere*, M. D. 362 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1954. Price $6.

The purpose of this book is to present a concise resumé of the journal literature, foreign and domestic, dealing with orthopedic and traumatic surgery for the year November 1952 to November 1953. This volume stands up well in comparison to those of previous years and is essentially the same in style and format. The editor accomplishes this task by presenting brief abstracts of 233 selected papers. The subject matter is conveniently classified into 17 sections of well-illustrated and accurately printed material. Emphasis is placed on articles dealing with basic research, in a special section on "Anatomy, Embryology, Pathology, and Physiology of the Skeletal System."

It is perhaps inevitable that some readers will take issue over the choice of papers selected for inclusion in this volume. To this reviewer, it appeared that several good articles published in 1953 were omitted from this edition at the expense of space devoted to case reports. Similarly, several articles are abstracted which deal with reports of surgical results in very small series of cases.

An interesting feature is the "editor's notes" which are succinct and stimulate the reader's interest in the subject matter. A few of the comments will probably be at variance with the opinions of discriminating readers.

A warning should go with the book. It is not a substitute for reading the original articles. The well-written abstracts are of necessity brief. As in all material taken from its original context, they may be misleading to the uninitiated or to the reader not specializing in orthopedics. These criticisms are not meant to detract from the extreme usefulness of this volume. Doctor Compere is to be thanked and complimented for turning out a valuable addition to medical literature. The book is well worth its price and deserves a place in every surgeon's library.

—*HERBERT A. MARKOWITZ, Comdr. (MC) USN*

LUNG CANCER, by *Seymour M. Farber*, M. D. 157 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $4.75.

In this monograph in pleasant scientific prose, the etiology, pathology, and theory required for an understanding of lung cancer are simply but adequately outlined. Both sides of controversial points are given fair emphasis before the author states his opinion, as for example, his belief that there has been a real increase in the incidence of lung cancer which he is not prepared to attribute entirely to carcinogens in tobacco. The lavish use of tar and petroleum products may prove more important in the genesis of this disease, or constitutional factors such as metabolism and heredity may affect its incidence more than exogenous agents. The discussion of the etiology and chemotherapy of bronchogenic cancer includes encouraging experimental

data which applies to all neoplastic disease. The morphologic types of pulmonary malignancies are skillfully correlated with certain kinds of clinical behavior.

The sections on clinical history, chest roentgenograms, and physical findings yield unexpected diagnostic tips, and the volume's readability and comprehension are facilitated by avoidance of overly qualified statements. The discussion of the special diagnostic procedures elaborates on the technic of preparing sputum smears for cytologic study, and implies that this might well be included in periodic examinations of all men over 40 because it is the most useful diagnostic procedure for detecting operable cancer.

The chapter on surgery will be remembered for the discouraging statistics on operability. Barely 10 percent of those malignant tumors explored and resected are cured. Even if the speed and accuracy of diagnosis could be doubled, it appears that four out of five lung cancer patients will still remain beyond the help of the surgeon. Of special interest, therefore, is the splendid discourse on the management of inoperable patients and the ray of hope that chemotherapy holds for the future.

This book is supplemented by figures of pathologic slides, roentgenograms, and cytologic stains of sputum smears, and contains an excellent bibliography. In it the author unintentionally reveals his stature as a humanitarian as well as a scientist. It is recommended especially for the clinician equally concerned with people and theory.

—JACK C. SHRADER, Lt. Col., USAF (MC)

LABORATORY INSTRUMENTS, Their Design and Application, by *A. Elliott*, Ph. D., D. Sc., and *J. Home Dickson*, M. Sc. 414 pages; illustrated. Chemical Publishing Co., Inc., New York, N. Y., 1953. Price $7.50.

The purpose of the authors, according to the preface, is to present the principles on which good design of research instruments is based, with examples of the application of these principles. They did not attempt to cover the whole field of instrument design. This book contains much, however, which is neither design nor the application of design. For example, there is a rather sketchy chapter on materials and a short chapter on the preparation of drawings. Both of these subjects are more adequately covered in many other readily available sources.

The book does not provide sufficient information to be of real value in completing an end product. The references are another shortcoming because most are not readily available in libraries in the United States. The authors are prone to use brand names for materials, which is confusing to the many American readers. The volume would definitely be of some good use to the individual scientist in attempting to design an instrument intended to objectively measure an effect. To some degree it would also aid a group of instrument designers and makers.

—HENRY M. SWEENEY, Col., USAF

NEW BOOKS

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be selected for review in a later issue.

WARTIME PSYCHIATRY, A Compendium of the International Literature, edited by *Nolan D. C. Lewis*, M. D., Director of Research in Neurology and Psychiatry, New Jersey State Hospitals and Agencies; Formerly Executive Head of the Department of Psychiatry, College of Physicians and Surgeons, Columbia University; and Director, New York Psychiatric Institute; and *Bernice Engle*, M. A., Research Assistant, Langley Porter Clinic and University of California School of Medicine. 952 pages. Oxford University Press, Inc., New York, N. Y., 1954. Price $15.

NEW AND NONOFFICIAL REMEDIES, Containing Descriptions of the Articles which Stand Accepted by the Council on Pharmacy and Chemistry of the American Medical Association on January 1, 1954. Issued Under the Direction and Supervision of *The Council on Pharmacy and Chemistry, American Medical Association.* 609 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1954. Price $2.65.

ANATOMY OF THE BRONCHOVASCULAR SYSTEM, Its Application to Surgery, by *George L. Birnbaum*, M. D., Chief, Surgical Unit, Veterans Administration Regional Office, Portland, Oreg. Foreword by *Evarts A. Graham*, M. D., Professor Emeritus of Surgery, Washington University, St. Louis. 300 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1954. Price $15.

THE PHYSICAL ENVIRONMENT OF THE FLYER, by Dr. *Heinz Haber*, Air University, USAF School of Aviation Medicine. 179 pages; illustrated. Air University, USAF School of Aviation Medicine, Randolph Field, Tex., 1954.

THE DIAGNOSIS AND TREATMENT OF THE INFERTILE FEMALE, by *Fred A. Simmons*, M. D., Assistant Surgeon, Massachusetts General Hospital, Assistant Surgeon, Free Hospital for Women, Brookline, Mass., Instructor in Gynecology, Harvard Medical School, Boston, Mass. American Lecture Series, Publication Number 220, A Monograph in American Lectures in Endocrinology. Edited by *Willard O. Thompson*, M. D., Clinical Professor of Medicine, University of Illinois College of Medicine; Managing Editor, Journal of Clinical Endocrinology and Metabolism; Editor, Journal of the American Geriatrics Society, Chicago, Ill. 83 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill. 1954. Price $2.50.

ULTRASONIC AND ULTRASHORT WAVES IN MEDICINE, by *Johanna M. Van Went*, M. D., Director Institute for Physical Medicine and Rheumatism, Amsterdam, with an Introduction by *Kenneth Phillips*, M. D., F. A. C. P., Director Parkway Medical Clinic, and Dept. Physical Medicine, Jackson Memorial Hospital, Miami, Fla. 384 pages; illustrated. Elsevier Publishing Co., New York, N. Y., 1954. Price $9.

HEART DISEASE AND INDUSTRY, With Particular Reference to Workmen's Compensation Cases, by *Meyer Texon*, M. D., New York City. Forewords by *Samuel A. Levine*, M. D., and *Hubert Winston Smith*, LL.B., M. D. 324 pages. Grune & Stratton, New York, N. Y., 1954. Price $7.50.

NUTRITIONAL FACTORS AND LIVER DISEASES, Annals of The New York Academy of Sciences, Volume 57, Art. 6, Pages 615-962, May 10, 1954. Edited by *Roy Waldo Miner;* Consulting Editor and Conference Chairman: *Klaus Schwarz*. 347 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1954. Price $4.50.

LECTURES ON GENERAL PATHOLOGY, Delivered at the Sir William Dunn School of Pathology, University of Oxford. Edited by *Sir Howard Florey*, Professor of Pathology. 733 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $13.

FUNDAMENTALS OF ANESTHESIA, Prepared under the Editorial Direction of the *Consultant Committee for Revision of Fundamentals of Anesthesia*, a publication of the *Council on Pharmacy and Chemistry of the American Medical Association*. 3d edition. 279 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $6.

MUSCULAR CONTRACTION, by *M. Dubuisson*, Ph. D., Director, Laboratory of General Biology, University of Liége, Liége, Belgium. American Lecture Series, Publication Number 144, A Monograph in The Bannerstone Division of American Lectures in Biochemistry and Biophysics. Edited by *W. Bladergroen*, IR. (DELFT), M. A., Ph. D., Sandoz Ltd., Basle, Switzerland. 232 pages; 51 illustrations. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $6.50.

THE TREATMENT OF THE ALCOHOLIC, by *Fritz Kant*, M. D., Psychiatrist and Neurologist, Madison, Wis.; Professor of Neuropsychiatry, University of Wisconsin Medical School. 130 pages. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $3.50.

THE SURGERY OF PULMONARY TUBERCULOSIS, by *James H. Forsee*, M. D., F. A. C. S., F. A. C. P., Colonel, M. C., U. S. Army; Chief, Surgical Services, Fitzsimons Army Hospital, Denver, Colo. 208 pages; 59 illustrations, 1 in color; 11 graphs and 46 tables. Lea & Febiger, Philadelphia, Pa., 1954. Price $6.50.

CHEMOTHERAPY OF INFECTIONS, by *H. O. J. Collier*, Ph. D., M. I. Biol., Chief Pharmacologist, Allen and Hanburys Ltd., with a Foreword by *Sir Alexander Fleming*. 248 pages; illustrated. John Wiley & Sons, Inc., New York, N. Y., 1954. Price $4.

MAN ABOVE HUMANITY, A History of Psychotherapy, by *Walter Bromberg*, M. D. Foreword by *Winfred Overholser*, M. D., SC. D. 342 pages. J. B. Lippincott Co., Philadelphia, Pa., 1954. Price $5.75.

ARTHRITIS AND RHEUMATISM, The Diseases and Their Treatment, by *Charles LeRoy Steinberg*, M. D., Director of Arthritis Clinic and Senior Attending Physician in Medicine, Rochester General Hospital, with five contributors. 326 pages; illustrated. Springer Publishing Co., Inc., New York, N. Y., 1954. Price $10.

NUTRITION AND PHYSICAL FITNESS, by *L. Jean Bogert*, Ph. D. Formerly Instructor in the Department of Medicine, University of Chicago; Instructor in Experimental Medicine, Yale Medical School, and Lecturer in Chemistry, Connecticut Training-School for Nurses, New Haven; Professor of Food Economics and Nutrition, Kansas State Agricultural College, Manhattan; Research Chemist, Obstetrical Department, Henry Ford Hospital, Detroit. 6th edition. 664 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $4.50.

TEXTBOOK OF BIOCHEMISTRY, by *Benjamin Harrow*, Ph. D., Professor of Chemistry, College of the City of New York; and *Abraham Mazur*, Ph. D., Associate Professor of Chemistry, College of the City of New York. 6th edition. 563 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954.

THE BACTERIAL FACTOR IN TRAUMATIC SHOCK, by *Jacob Fine*, M. D., Department of Surgery, Beth Israel Hospital, Harvard Medical School, Boston, Mass. American Lecture Series, Publication Number 219, A Monograph in American Lectures in Circulation. Edited by *Irvine H. Page*, M. D., Cleveland Clinic, Cleveland, Ohio, and *A. C. Corcoran*, M. D., Cleveland Clinic, Cleveland, Ohio. 82 pages. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $2.75.

THE SCIENCE OF DENTAL MATERIALS, by *Eugene W. Skinner*, Ph. D., Professor of Physics, Northwestern University Dental School. 4th edition. 456 pages; illustrated; completely revised and rewritten. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $7.50.

GLANDULAR PHYSIOLOGY AND THERAPY, Prepared Under the Auspices of the *Council on Pharmacy and Chemistry of the American Medical Association*. 5th edition, completely revised and rewritten. 611 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1954. Price $10.

ANESTHESIA IN GENERAL PRACTICE, by *Stuart C. Cullen*, M. D., Chairman, Division of Anesthesiology, Department of Surgery, State University of Iowa Hospitals; Professor of Surgery (Anesthesiology), State University of Iowa College of Medicine. 4th edition. 312 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1954. Price $5.

ARREST OF BLEEDING, Physiology, Pharmacology, Pathology, by *Jacques Roskam*, M. D. Professor of Internal Medicine, University of Liége, Belgium. American Lecture Series, Publication Number 217, A Monograph in American Lectures in Physiology. Edited by *Robert F. Pitts*, M. D., Ph. D., Professor of Physiology and Biophysics, Cornell University Medical College, New York, N. Y. 71 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $2.75.

MANUAL OF PROCTOLOGY, by *Emil Granet*, M. D., Lecturer, Graduate School, Columbia University; Visiting Surgeon (Proctology), Sea View Hospital, and Associate Surgeon (Proctology), French Hospital, New York, N. Y.; Commander (MC) USNR. 346 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1954. Price $7.50.

PERIODONTIA, Clinical Pathology and Treatment of the Periodontal Tissues, by *Edgar D. Coolidge*, M. S., D. D. S., LL. D., (Hon. Loyola); Professor Emeritus of Therapeutics, Preventive Dentistry and Oral Hygiene, Chicago College of Dental Surgery, School of Dentistry, Loyola University, Chicago, Ill.; Formerly Professor of Materia Medica, Pharmacology and Therapeutics of the School of Dentistry, University of Illinois; and *Maynard K. Hine*, M. S., D. D. S., Professor of Periodontia and Histopathology, and Dean, Indiana University School of Dentistry; Formerly Rockefeller Fellow in Dentistry and Carnegie Fellow in Dentistry, Rochester School of Medicine and Dentistry and Assistant Professor of Dental Pathology and Therapeutics, School of Dentistry, University of Illinois, Chicago, Ill. 2d edition, thoroughly revised, 384 pages; 424 illustrations on 250 figures and 2 color plates. Lea & Febiger, Philadelphia, Pa., 1954. Price $7.50.

CORRECTIVE PHYSICAL EDUCATION, by *Josephine Langworthy Rathbone*, Ph. D., Associate Professor of Health and Physical Education, Teachers College, Columbia University. 5th edition. 318 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $4.50.

GENERAL CYTOLOGY, by *E. D. P. De Robertis,* M. D., Head of the Department of Cell Ultrastructure, Institute for the Investigation of Biological Sciences, Montevideo, Uruguay; *W. W. Nowinski,* Ph. D., Associate Professor of Biochemistry, University of Texas Medical School; and *Francisco A. Saez,* Ph. D., Head of the Department of Cytogenetics, Institute for the Investigation of Biological Sciences, Montevideo, Uruguay. 2d edition. 456 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $7.75.

PRACTICAL FLUID THERAPY IN PEDIATRICS, by *Fontaine S. Hill,* M. D., Assistant Professor of Pediatrics, University of Tennessee College of Medicine, Memphis; Staff Member of the John Gaston Children's Hospital and the Le Bonheur Children's Hospital. 275 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $6.

FUNDAMENTALS OF OTOLARYNGOLOGY, A Textbook of Ear, Nose and Throat Diseases, by *Lawrence R. Boies,* M. D., Clinical Professor of Otolaryngology; Director of Division of Otolaryngology, University of Minnesota Medical School. 2d edition. 487 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $7.

SURGICAL FORUM. Proceedings of the Forum Sessions, Thirty-Ninth Clinical Congress of the American College of Surgeons, Chicago, Ill., October 1953. *Surgical Forum Committee, I. S. Ravdin,* M. D., F. A. C. S., Chairman. 752 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $10.

VERTEBRATE DISSECTION, by *Warren F. Walker, Jr.,* Ph. D., Associate Professor of Zoology, Oberlin College, Oberlin, Ohio. 331 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $3.50.

PERIPHERAL CIRCULATION IN MAN, A Ciba Foundation Symposium. Editors for the Ciba Foundation: *G. E. W. Wolstenholme,* O. B. E., M. A., M. B., B. Ch., and *Jessie S. Freeman,* M. B., B. S., D. P. H., assisted by *Joan Etherington.* 219 pages; with 72 illustrations. Little, Brown and Co., Boston, Mass., 1954. Price $6.

MODERN PRACTICE IN ANAESTHESIA, edited by *Frankis T. Evans,* M. B., F. F. A. R. C. S., D. A., Consultant Anaesthetist, St. Bartholomew's Hospital, London. 2d edition. 622 pages; illustrated. Paul B. Hoeber, Inc., New York, N. Y., 1954. Price $12.50.

THE PERMANENT REVOLUTION IN SCIENCE, by *Richard L. Schanck,* Chairman, Department of Sociology, Bethany College, Lecturer, Carnegie Institute of Technology. 112 pages. Philosophical Library, Inc., New York, N. Y., 1954. Price $3.

MODERN TRENDS IN DERMATOLOGY (Second Series), edited by *R. M. B. MacKenna,* M. A., M. D. (Camb.), F. R. C. P. (Lond.); Physician in Charge, Dermatological Department, and Lecturer in Dermatology, St. Bartholomew's Hospital and Medical College, London; Physician to St. John's Hospital for Diseases of the Skin, London; Honorary Consultant in Dermatology to the British Army. 338 pages; illustrated. Paul B. Hoeber, Inc., New York, N. Y., 1954. Price $12.

ADVANCES IN INTERNAL MEDICINE, Volume VI, edited by *William Dock,* M. D., Long Island College of Medicine, Brooklyn, and *I. Snapper,* M. D., Beth-El Hospital, Brooklyn. 375 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1954. Price $10.

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